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TRADE NAME	MODEL	SET AND FOLDER No.
Admiral	T2301Z, ZN, T2302Z, ZN, T2326Z, ZN, T2327Z, ZN, TS2301Z, ZN, TS2302Z, ZN, TS2326Z, ZN, TS2327Z, ZN (Ch. 18SX4BZ, 18X4CZ, 18X4EZ, 18X4FZ, 18X4GZ, 18XP4BZ) Tel. Rec.	280-2
Airline	GSL-1581A, GSL-1582A	280-3
Airline	WG-5100A, B Tel. Rec.	280-4
Hoffman	21B137U, 21B309U, 21B510TU, U, 21B701TU, U, 21M136U, 21M308U, 21M509TU, U, 21M700TU, U, 21P310U (Ch. 196, M, T) Tel. Rec., Prod. Chg. Bul. 124	280-1
Majestic	21C36, 21C37, 21C38, 21C39, 21D56, 21D57, 21D58, 21D59, 21T22, 21T23 (Series 116) Tel. Rec.	280-5
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Pilot	AA-420	280-9
Roland	10XF1	280-10
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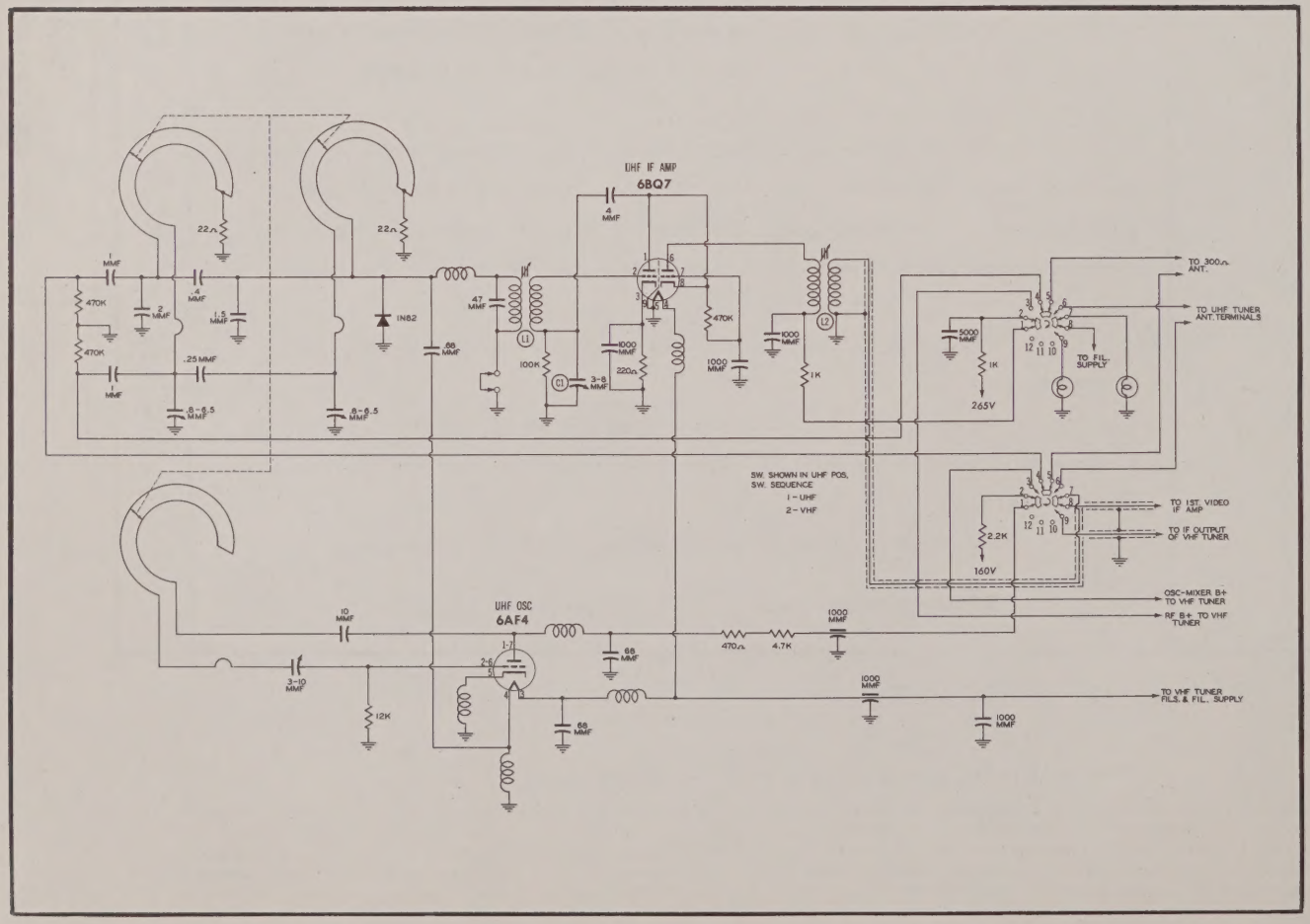
Truetone	D2560A	280-11
Wilcox-Gay	4B10, 4F10 Recorder	280-12


UHF IF AMP
6BQ7
UHF OSC
6AF4
22Ω
22Ω
1 MMF
4 MMF
470K
470K
2 MMF
1.5 MMF
.25 MMF
1 MMF
.8-8.5 MMF
.8-8.5 MMF
1N82
47 MMF
.68 MMF
100K
L1
G1
3-8 MMF
1000 MMF
220Ω
4 MMF
470K
1000 MMF
1000 MMF
1K
L2
5000 MMF
1K
265V
TO 300Ω ANT.
TO UHF TUNER ANT. TERMINALS
TO FIL. SUPPLY
SW. SHOWN IN UHF POS.
SW. SEQUENCE
1 - UHF
2 - VHF
2.2K
160V
TO 1ST. VIDEO IF AMP
TO IF OUTPUT OF VHF TUNER
OSC-MIXER B+ TO VHF TUNER
RF B+ TO VHF TUNER
10 MMF
3-10 MMF
12K
.68 MMF
.68 MMF
470Ω
4.7K
1000 MMF
1000 MMF
1000 MMF
TO VHF TUNER FIL.S & FIL. SUPPLY

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Motorola chassis TS-418, Y, VTS-418, Y, VTS-518, Y and WTS-518, Y were covered in Photofact Folder 9 — Set 269.

Late production changes and model additions are given in this bulletin.

A complete list of all models and chassis used in each is given below.

MODEL	CHASSIS	MODEL	CHASSIS
Y17T20	TS-418Y	17T20	TS-418
Y17T20B	VTS-418Y	17T20B	VTS-418
Y17T20E	VTS-418Y	17T20E	VTS-418
Y17T20M	VTS-418Y	17T20M	VTS-418
Y17T21	TS-418Y	17T21	TS-418
Y17T22B	VTS-418Y	17T22B	VTS-418
Y17T22E	VTS-418Y	17T22E	VTS-418
Y17T23	TS-418Y	17T23	TS-418
Y17T23B	TS-418Y	17T23B	TS-418
Y21K19	WTS-518Y	21K19	WTS-518
Y21K19B	WTS-518Y	21K19B	WTS-518
Y21K26	VTS-518Y	21K26	VTS-518
Y21K26B	VTS-518Y	21K26B	VTS-518
Y21T15	WTS-518YA-02	21T15	WTS-518
Y21T16	WTS-518Y	21T16	WTS-518
Y21T16B	WTS-518Y	21T16B	WTS-518
Y21T16E	WTS-518Y	21T16E	WTS-518
Y21T17	VTS-518Y	21T17	VTS-518
Y21T17B	VTS-518Y	21T17B	VTS-518

ALTERNATE FLYBACK

Some models use an alternate horizontal output transformer, part #24K733646.

NOTE: The primary and secondary coils of the horizontal output transformer may be replaced individually. Part numbers are given below for replacement purposes.

24K730695 - Primary coil (for high voltage transformer 24K733106 or 24K733646).

24K733107 - Secondary coil (for high voltage transformer 24K733106 or 24K733646).

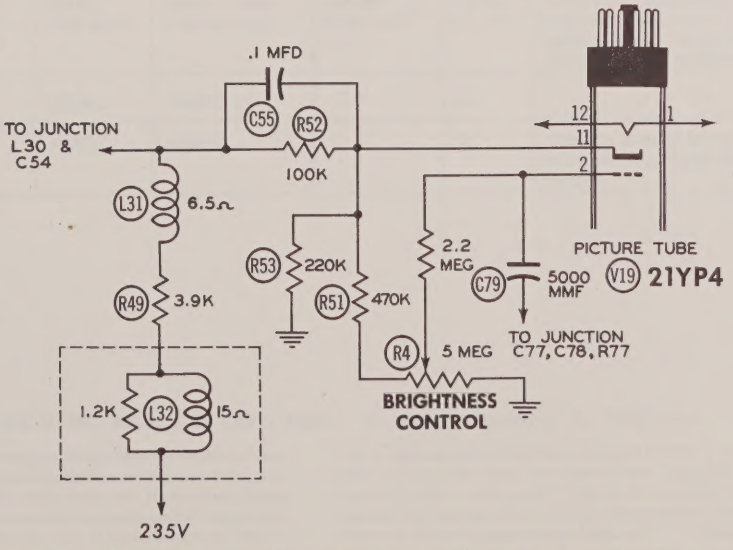
Chassis Coded B-02, B-03

CIRCUIT CHANGE

A 2.2Meg resistor, ½ watt, part #6R3927, has been added between the grid of the picture tube (pin 2 - V19) and the center arm of the brightness control (R4).

R51, 470KΩ which connected to the junction of L31, R49 and R50 is now connected to the cathode of the picture tube (pin 11 - V19).

A partial schematic showing the revised circuit is given below.



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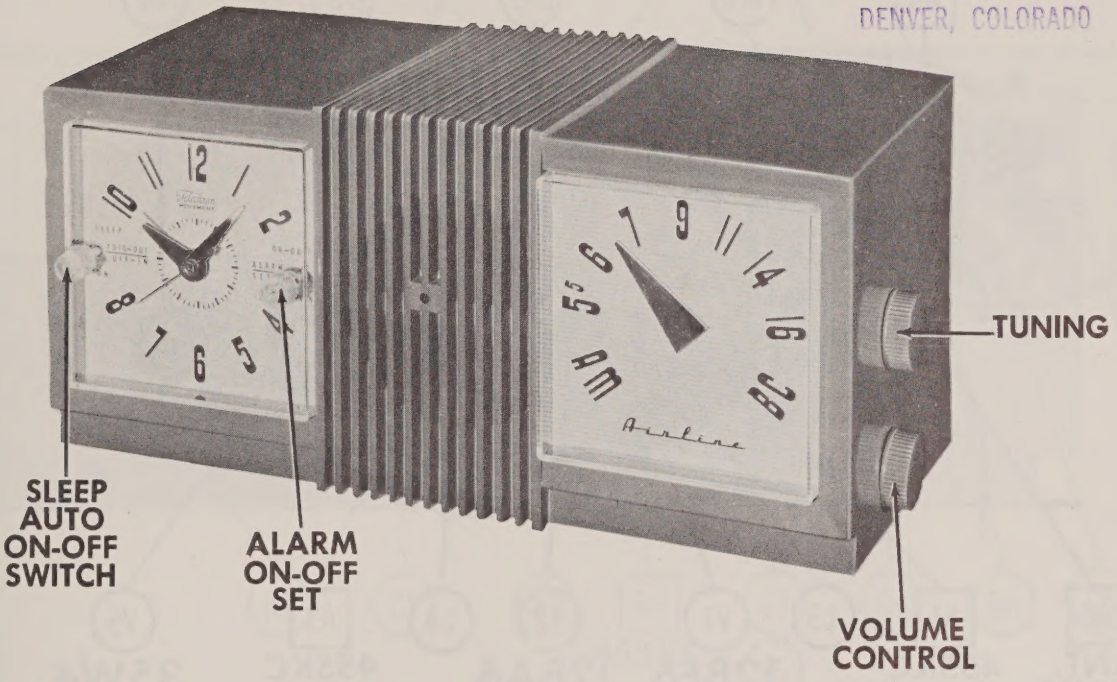

AIRLINE
MODELS GSL-1581A, GSL-1582A

TRADE NAME	Airline Models GSL-1581A, GSL-1582A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to ant. stator lug. Low side to B-.	455KC (400~Mod)	Point of non-interference	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	1620KC	"	A5	"
3.		Loop	1400KC	1400KC	"	A6	Fashion loop of several turns of wire of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

AIRLINE MODEL GSL-1581A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	50	150	R-1340			TCD497	TDL-5030-150	FMD-301	
B	30	150							
C2	.05	200		DF-502		PT415	IMP2-S5	330215	
C3	.05	200		DF-502		PT415	IMP2-S5	330215	
C4A	220		♦R-1236	♦PC-151	♦1408-02				
B	5000								
C	5000								
D	250								
E									
C5	.01	400		D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C6	.05	400		DF-503		PT415	IMP4-S5	330415	
C7	.05	200		DF-503		PT415	IMP4-S5	330215	

♦ Items C4A, C4B, C4C, C4D, C4E, R5A, R5B and R5C are combined in one unit. When replacing items separately C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ with 47KΩ stop	½	N8250	Q13-133	A47-500K-Z	AB-60	U-48	Volume - Note
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A

Note: Connect a 47KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22KΩ	½		BTS-22K	
R3	100Ω	½		BTS-100	
R4	1Meg	½		BTS-1Meg	

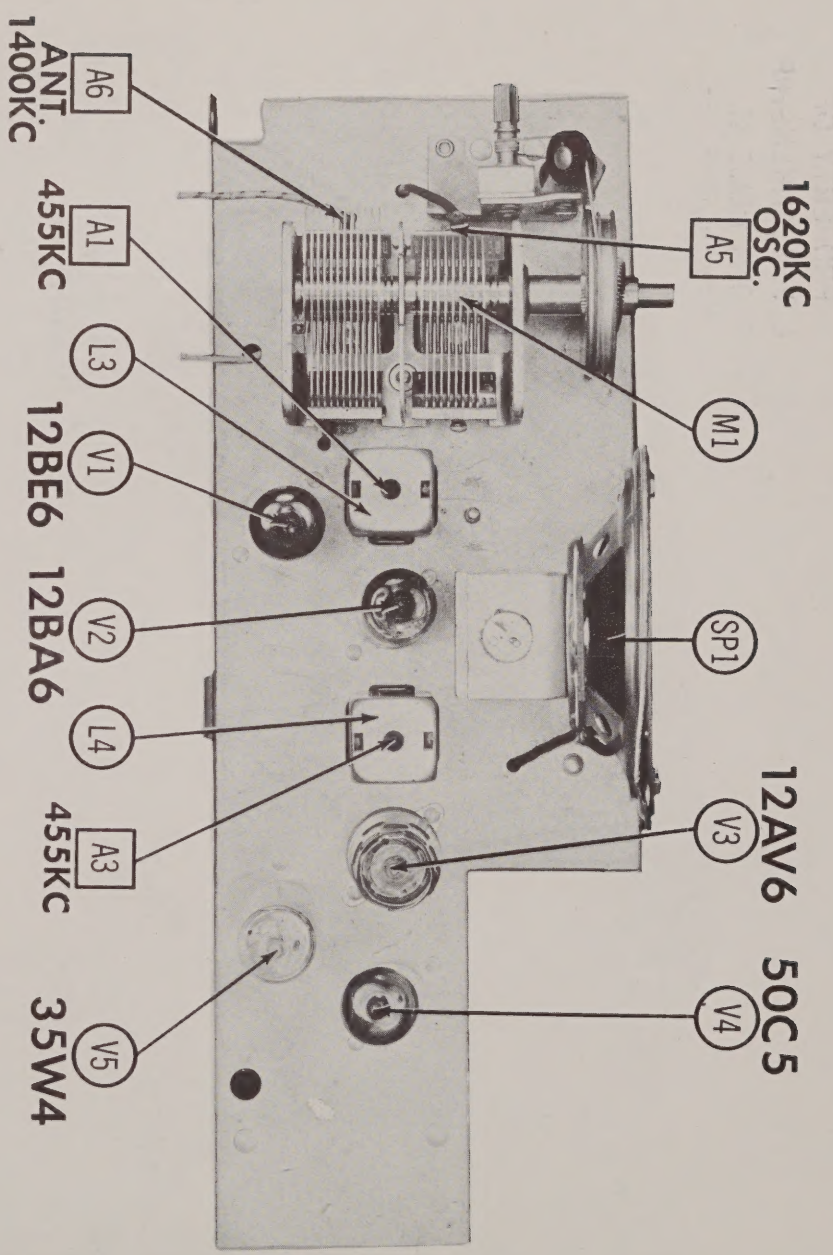
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R5A	6.8Meg	½	♦R1236	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R6	180Ω	½		BTS-180	
R7	1200Ω	1		BTA-1200	

♦ Items R5A, R5B, R5C, C4A, C4B, C4C, C4D and C4E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	4Ω	R-1336	A-3332	A-3025	S-12X	Z1101	26S58	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	VIKING PART No.	QUAM PART No.	
SP1	3½"	PM	4Ω	N-8247	35J6	3A07	

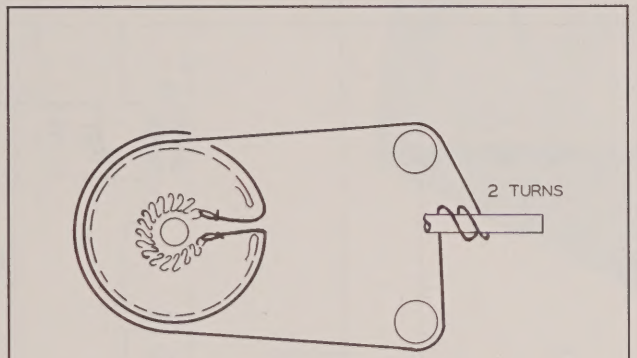
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.4Ω		R-1338				Includes cabinet back
L2	Osc. Coil	.6Ω	7.5Ω	N-8709	14-1073 *		69-OSC ■	
L3	Input IF	15Ω	15Ω	R-1234	16-6758	BC-352	12-C1	Alternate part #R-1237
L4	Output IF	15Ω	15Ω	R-1234	16-6758	BC-353	12-C2	Alternate part #R-1237

* Leads sufficient mounting support.
■ Drill mounting hole.

MISCELLANEOUS

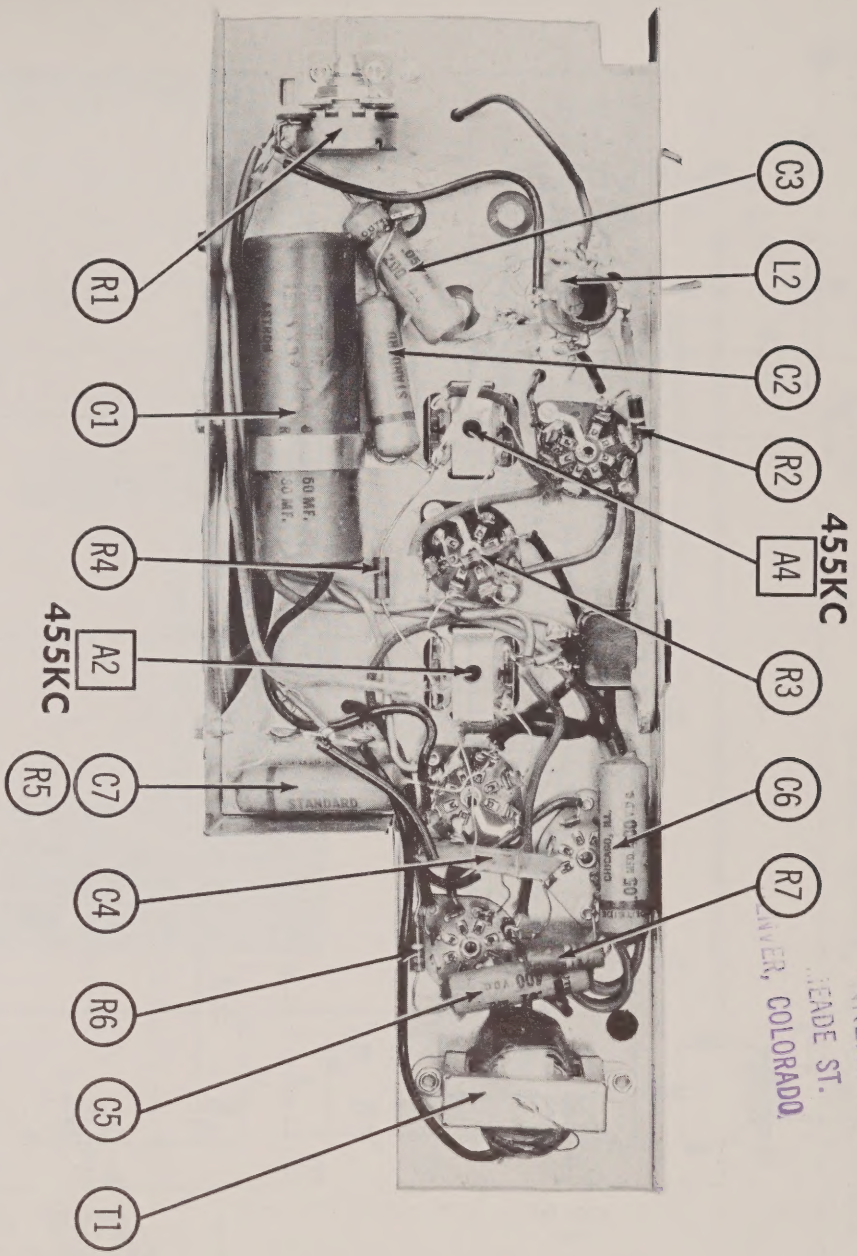
ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M1	Tuning Cap.	R-1328	2 Gang (30-385MMF, 14-120MMF)
M2	Clock	R-1346	Model GSL-1581A
	Clock	R-1327	Model GSL-1582A
	Cabinet	514	Model GSL-1581A
	Cabinet	515	Model GSL-1582A
	Knob	R-1335	Tuning & volume - Model GSL-1581A
	Knob	R-1339	Tuning & volume - Model GSL-1582A
	Knob	N-9784	Clock - 2 used



TUNING CORD ASSEMBLY WITH
TUNING GANG FULLY CLOSED

DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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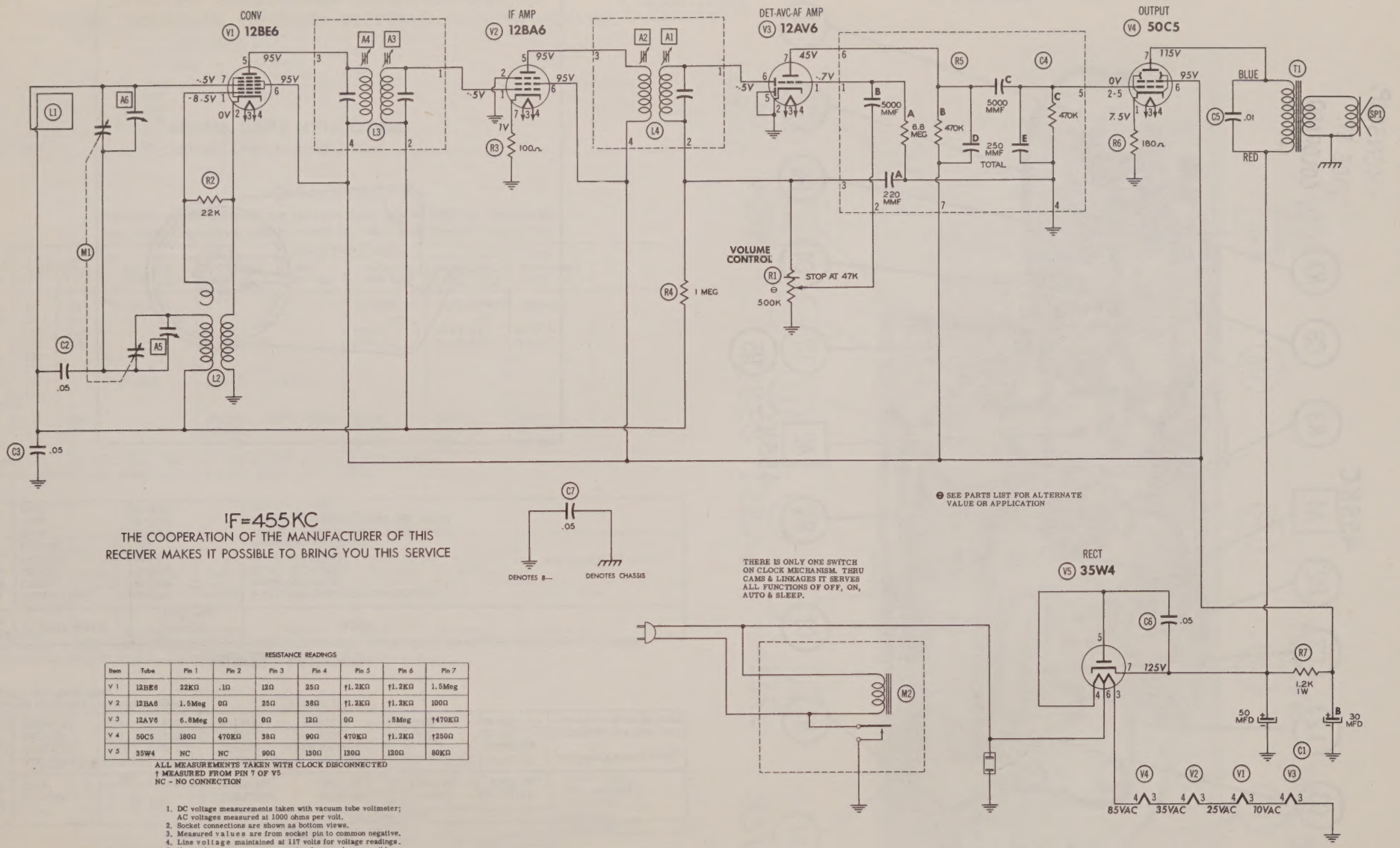
AIRLINE MODEL GSL-1581A



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

THERE IS ONLY ONE SWITCH ON CLOCK MECHANISM. THRU CAMS & LINKAGES IT SERVES ALL FUNCTIONS OF OFF, ON, AUTO & SLEEP.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.1Ω	12Ω	25Ω	†1.2KΩ	†1.2KΩ	1.5Meg
V 2	12BA6	1.5Meg	0Ω	25Ω	38Ω	†1.2KΩ	†1.2KΩ	100Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	0Ω	.5Meg	†470KΩ
V 4	50C5	180Ω	470KΩ	38Ω	90Ω	470KΩ	†1.2KΩ	†250Ω
V 5	35W4	NC	NC	90Ω	130Ω	130Ω	120Ω	80KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED
† MEASURED FROM PIN 7 OF V5
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

ADMIRAL CHASSIS 18SX4BZ, 18X4CZ, 18X4EZ, 18X4FZ, 18Z4GZ, 18XP4BZ

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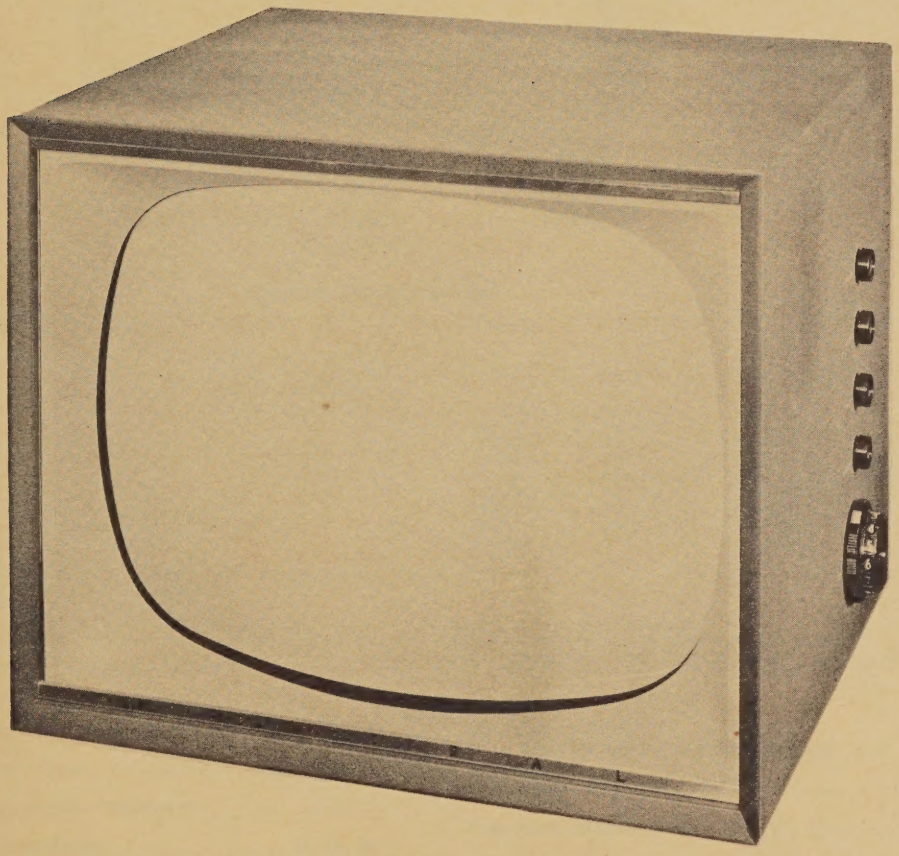

MODEL T2302ZN

ADMIRAL CHASSIS 18SX4BZ, 18X4CZ, 18X4EZ, 18X4FZ, 18Z4GZ, 18XP4BZ

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DATE 6–55 SET 280 FOLDER 2

ADMIRAL CHASSIS 18SX4BZ, 18X4CZ, 18X4EZ, 18X4FZ, 18Z4GZ, 18XP4BZ

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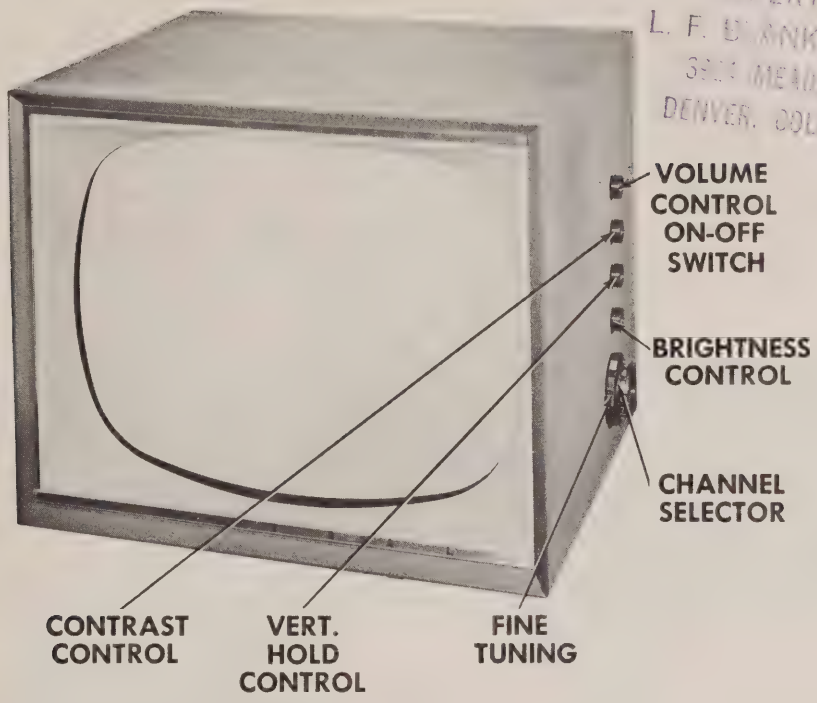

ADMIRAL MODEL T2302ZN

TRADE NAME	Admiral	MODELS	CHASSIS		
		T2301Z, ZN, T2302Z, ZN, T2326Z, ZN, T2327Z, ZN.....	18XP4BZ.....	94D77-1	(VHF only)
		TS2301Z, ZN, TS2302Z, ZN, TS2326Z, ZN, TS2327Z, ZN.....	18SX4BZ	94E75-2	(VHF-UHF)
			18X4CZ	94D46-5	(VHF only)
			18X4EZ.....	94D46-6, -7, -8	(VHF only)
			18X4FZ	94D46-6, -7, -8	(VHF only)
			18X4GZ	94D46-6, -7, -8	(VHF only)
			18XP4HZ	94D77-1	(VHF only)
			18XS4EZ.....	94E75-2	(VHF-UHF)
			18SX4FZ	94E75-2	(VHF-UHF)
			18SX4GZ.....	94E75-2	(VHF-UHF)

MANUFACTURER Admiral Corp., 3800 W. Cortland St., Chicago 47, Ill.
TYPE SET Television Receiver
TUBES Eighteen
POWER SUPPLY 110-120 Volts AC - 60 Cycles RATING 1.46 Amp. @ 117 Volts AC
TUNING RANGE - Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 25.75MC (VHF Models) 45.75MC (VHF-UHF Models)
Sound IF 21.25MC (VHF Models) 41.25MC (VHF-UHF Models) (Intercarrier)

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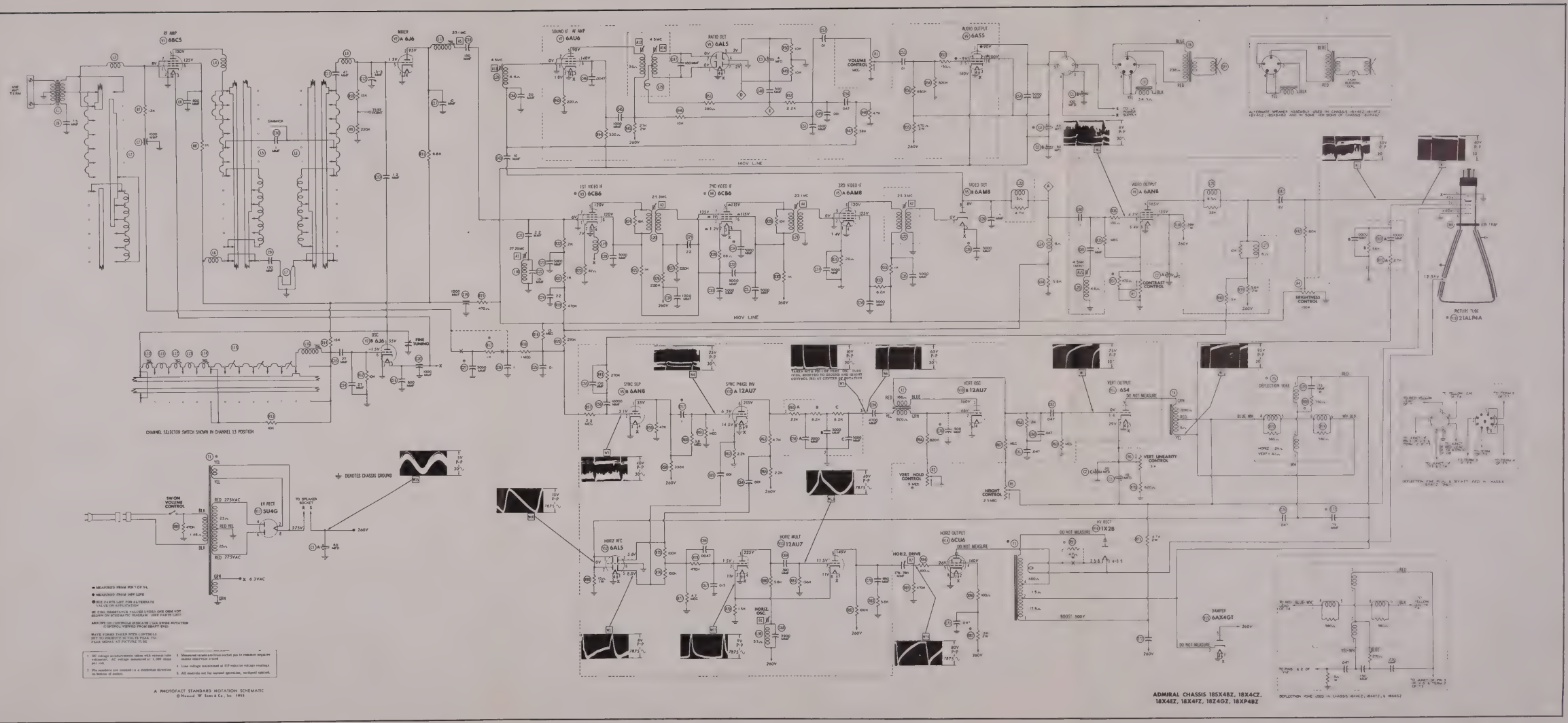

ADMIRAL CHASSIS 18SX4BZ, 18X4CZ,
18X4EZ, 18X4FZ, 18Z4GZ, 18XP4BZ

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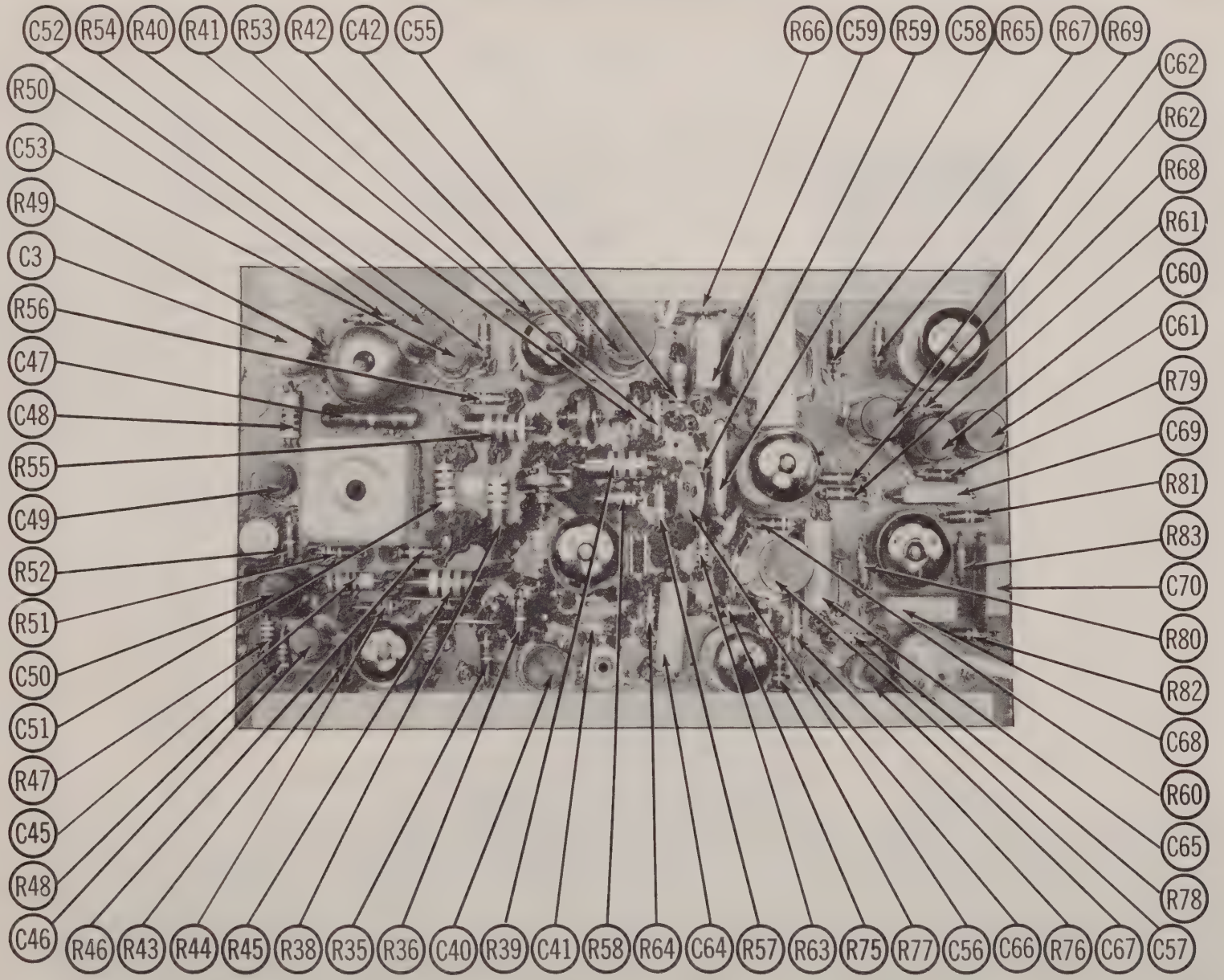
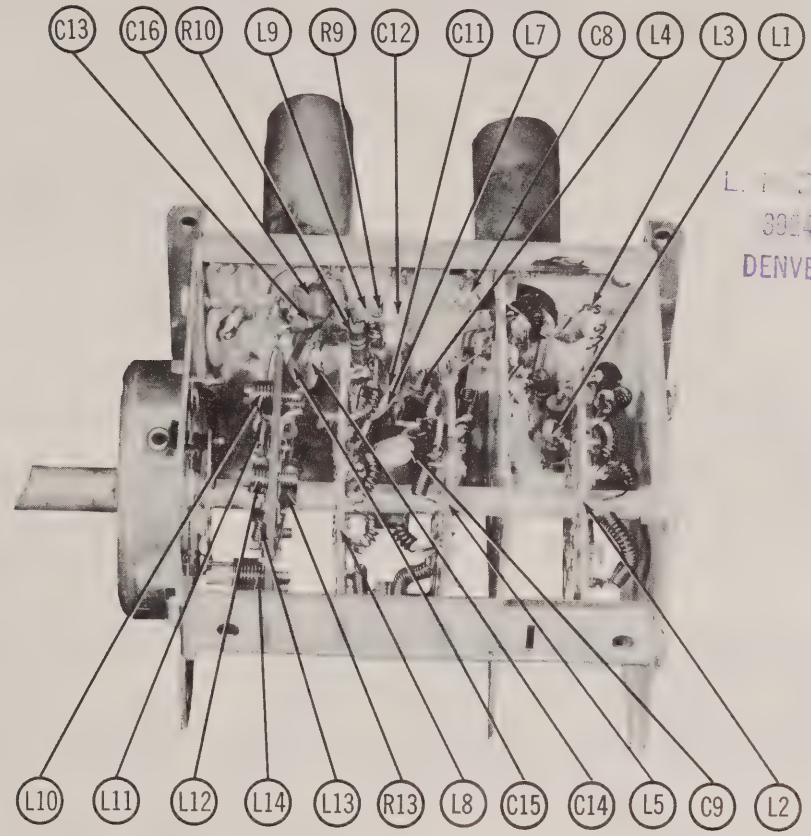
CHASSIS TOP VIEW

ADMIRAL CHASSIS 18SX4BZ, 18X4CZ, 18X4EZ, 18X4FZ, 18Z4GZ, 18XP4BZ



PRINTED CIRCUIT SUB-CHASSIS - RESISTOR & CAPACITOR IDENTIFICATION



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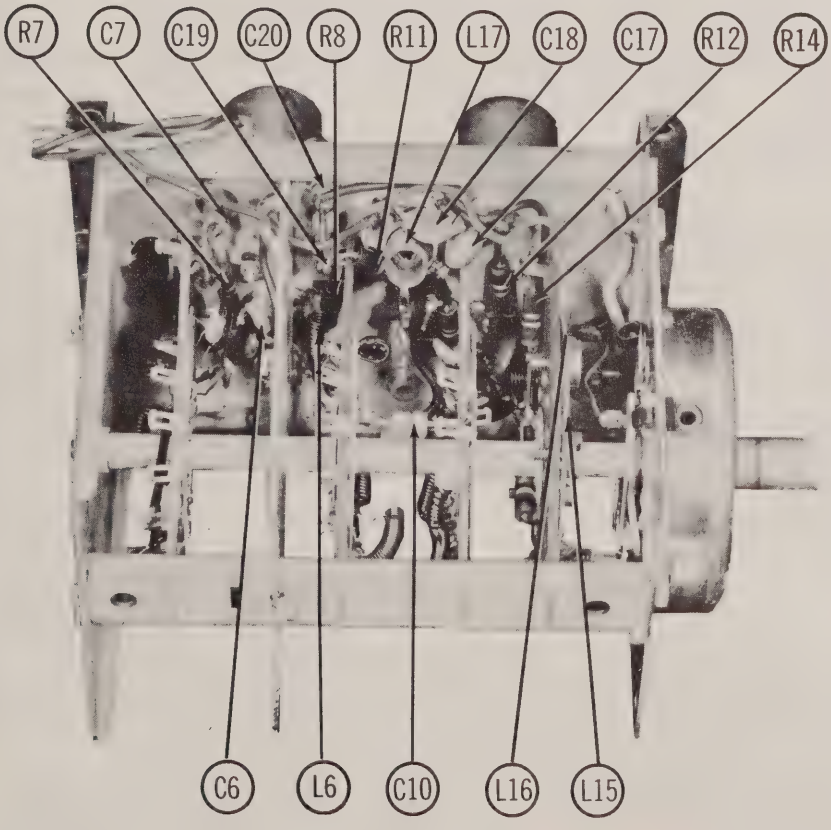
RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT FOR VHF MODELS

Remove the converter tube (V2) from its socket and replace with a 6J6 with pin 1 removed.
Disconnect antenna and short antenna terminals with a short jumper.
Set the contrast control for minimum contrast.
Connect the negative lead of a 3 volt battery thru 10KΩ to the ungrounded side of C24. Positive lead to chassis.
Use only enough generator output to provide a usable indication on VTVM. (1 volt maximum.)
Allow about 15 to 20 minutes for test equipment and receiver warm-up time.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	27.25MC (Unmod)	Any unused high band channel.	DC probe thru decoupling filter (Fig. 1) to point Ⓐ. Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	25.3MC	"	"	A2, A3	Adjust for maximum deflection.
3.	"	"	23.1MC	"	"	A4, A5	"

OVERALL VIDEO IF RESPONSE CHECK FOR VHF MODELS

Leave bias battery connected as under "Video IF Alignment".
Use only enough sweep generator output to provide usable indication on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.25MC 22.0MC 24.3MC 25.75MC 27.25MC	Any unused high band channel.	Vert. amp. thru decoupling filter (Fig. 1) to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig. 2. If necessary, retouch A1 thru A5 to obtain desired response. Adjust A2 and A3 for position of 25.75MC marker and amplitude of response curve on high frequency side. Adjust A4 and A5 for position of 22MC marker and amplitude of response curve on low frequency side.

VIDEO IF ALIGNMENT FOR UHF-VHF MODELS

Set the contrast control for minimum contrast. Connect the negative lead of a 3 volt battery to point Ⓑ. Positive lead to chassis. Use only enough generator output to provide a usable indication on VTVM. (2 volt maximum.)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	Direct	High side to an ungrounded tube shield floating over converter tube (6U8). Low side to chassis.	47.25MC	12	DC probe thru decoupling filter (Fig. 1) to point Ⓒ. Common to chassis.	A6	Adjust for MINIMUM deflection. If necessary, reduce bias to -1.5 volts to provide reading on VTVM.
6.	"	"	43.5MC	"	"	A7, A8	Adjust bias back to -3 volt if reduced for adjustment of A6. Adjust A7 and A8 for maximum deflection.
7.	"	"	45.3MC	"	"	A7, A9, A10	Adjust for maximum deflection.
8.	"	"	43.3MC	"	"	A11	"

OVERALL VIDEO IF ALIGNMENT FOR UHF-VHF MODELS

Leave bias connected as under "Video IF Alignment For UHF-VHF Models".
Use only enough sweep generator output to provide usable indication on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Direct	High side to an ungrounded tube shield floating over converter tube (6U8). Low side to chassis.	44MC (10MC Swp)	43.0MC 45.0MC 45.75MC 47.25MC	12	Vert. amp. thru decoupling filter (Fig. 1) to point Ⓒ. Common to chassis.		Check for response curve similar to Fig. 3. If necessary, retouch A6 thru A11 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Disconnect antenna and short terminals together.
Set the contrast control for minimum contrast.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel.	DC probe to point Ⓓ. Common to chassis.	A12, A13	Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
11.	"	"	"	"	DC probe to point Ⓔ. Common to chassis.	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point Ⓓ. Low side to chassis.	A12, A13	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
11.	"	"	"	"	"	Vert. amp. to point Ⓔ Low side to chassis.	A14	Reconnect stabilizing capacitor (C3). Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Remove bias battery and replace original tuner oscillator tube in its socket. Tune in a TV station. Adjust A12 and A13. VTVM connected as in step 10 of "Sound IF Alignment Using AM Signal Generator and VTVM". Adjust A14 for best program sound with minimum buzz. This point will be found between two maximum buzz peaks.

4.5MC TRAP ALIGNMENT

Short L23 with a short jumper wire.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
12.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC	Any	DC probe to point Ⓓ. Common to chassis.	A15	Connect a 10MMF capacitor from pin 6 (plate) of 6AN8 (V6) to pin 7 (cathode) of 6AU6 (V7). Use lowest scale on VTVM and adjust for MINIMUM deflection.

ALIGNMENT INSTRUCTIONS (cont)

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust A15 for minimum 4.5MC beat interference in picture.

VHF TUNER 94D77-1 ALIGNMENT

This tuner has been properly aligned at the factory. Alignment is not recommended in the field.

OSCILLATOR ALIGNMENT FOR VHF TUNER 94D46-6-7 or-8

Replace original tuner oscillator tube in its socket. The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screws are accessible through this hole as the channel switch is turned to each channel.
Leave bias battery connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru decoupling filter to point Ⓐ. (Point Ⓐ as shown on VHF chassis) Low side to chassis.	A16	Adjust to place video marker at 50% as in Fig. 6. Sound marker should not exceed 5% on response curve.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A17	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A18	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A19	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A20	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A21	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A22	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A23	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A24	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A25	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A26	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A27	

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RF ALIGNMENT FOR VHF TUNER 94D46-6-7 or -8

Leave bias connected as under "Video IF Alignment". The bias supply may be removed if it is difficult to obtain a response of sufficient amplitude. If bias is removed, short out to chassis point where bias supply was connected.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. amp. thru 10KΩ to point Ⓕ. Low side to chassis.	A28, A29 A30	Adjust for response curve similar to Fig. 7 with markers above 90%.
15.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 7. If markers fall below 70% on any channel, make slight compromise adjustments of A28, A29 and A30 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

OSCILLATOR ALIGNMENT FOR VHF PORTION OF UHF-VHF TUNER 94E75-2

Switch tuner to VHF position and remove tuner knobs. With the fine tuning control near the center of its range, the VHF channel oscillator adjustment screws are accessible thru a hole just above and slightly to the left of the channel switch shaft. This hole extends thru the UHF tuner only when the channel switch is turned to each channel.
Connect the negative lead of a 3 volt battery to point Ⓖ. Positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω carbon resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 10KΩ to point Ⓒ. (Point Ⓒ as shown on UHF-VHF chassis using 41MC IF.) Low side to chassis.	A31	Adjust to place sound marker in trap notch as shown in Fig. 6. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A32	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A33	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A34	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A35	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A36	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A37	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A38	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A39	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A40	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A41	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A42	

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT FOR UHF PORTION OF UHF-VHF TUNER 94E75-2

Switch tuner to UHF position and remove tuner knobs. The UHF channel oscillator adjustment screws are reached thru a hold just above and slightly to the left of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Leave bias connect as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω carbon resistors	Across UHF antenna terminals with 120Ω in each lead.	473MC (10MC Swp)	471. 25MC 475. 75MC	14	Vert. amp. thru 10KΩ to point C . (Point C as shown on UHF-VHF chassis using 41MC IF.) Low side to chassis.	A43	Adjust bias to place sound marker in trap notch as in Fig. 6. Video should be at 50%.
			515MC (10MC Swp)	513. 25MC 517. 75MC	21		A44	
			575MC (10MC Swp)	573. 25MC 577. 75MC	31		A45	
			635MC (10MC Swp)	633. 25MC 637. 75MC	41		A46	
			695MC (10MC Swp)	693. 25MC 697. 75MC	51		A47	
			755MC (10MC Swp)	753. 25MC 757. 75MC	61		A48	
			815MC (10MC Swp)	813. 25MC 817. 75MC	71		A49	
			875MC (10MC Swp)	873. 25MC 877. 75MC	81		A50	

RF AND MIXER ALIGNMENT FOR VHF PORTION OF UHF-VHF TUNER 94E75-2

Connect the negative lead of a 3 volt battery to point G . Positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω carbon resistors	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205. 25MC 209. 75MC	12	Vert. amp. thru 10KΩ to point H . Low side to chassis.	A51, A52, A53	Adjust generator to provide a readable marker, but does not distort response curve. Adjust for response similar to Fig. 7.
18.	"	"	213MC (10MC Swp)	211. 25MC 215. 75MC	13	"		Check for response similar to Fig. 7. If markers fall below 70% on any channel, make compromise adjustments of A51, A52 and A53 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp)	55. 25MC 59. 75MC	2			

RF AND MIXER ALIGNMENT FOR UHF PORTION OF UHF-VHF TUNER 94E75-2

The UHF RF and mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

IF TRAP ADJUSTMENT

The IF trap adjustment (A54) is for the purpose of eliminating any IF interference from nearby transmitters operating in the 40MC band. If the IF interference is noted, turn to channel 2 and adjust A54 to minimize interference.

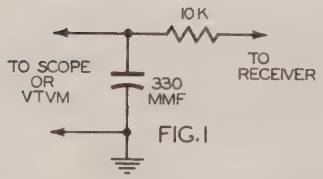


FIG.1

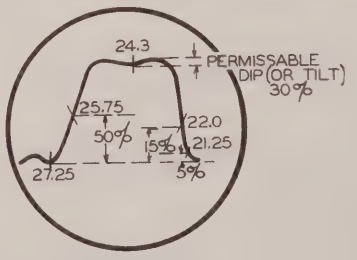


FIG.2

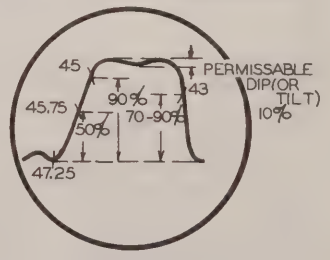


FIG.3

FIG.4

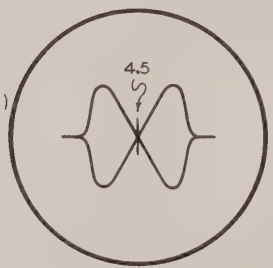


FIG. 5

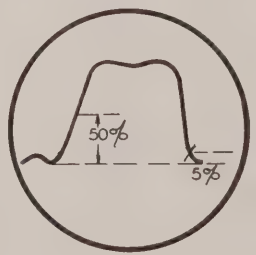


FIG. 6

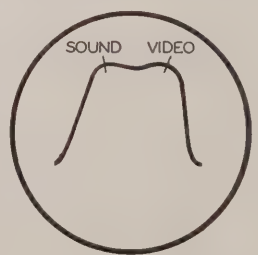
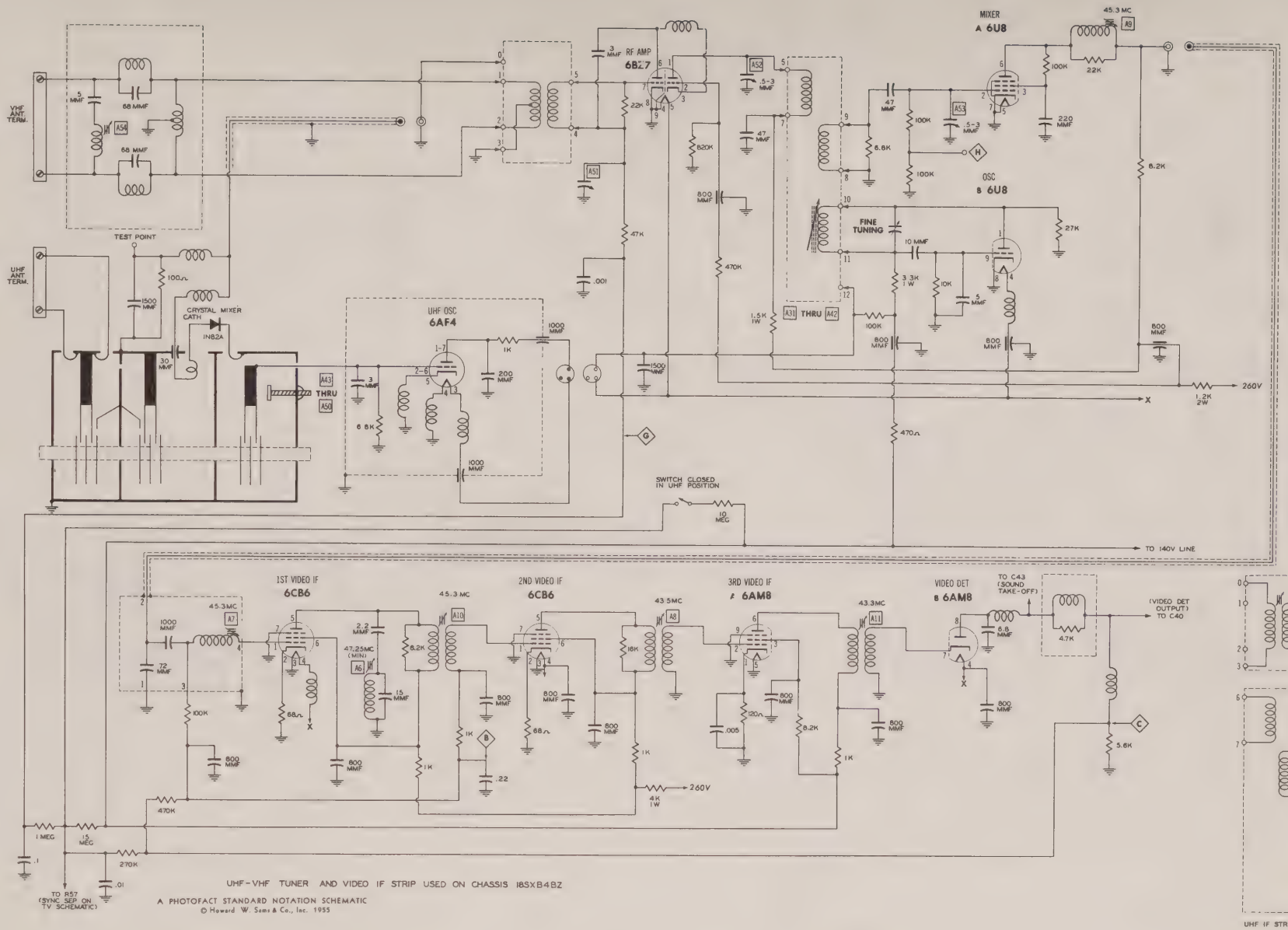


FIG. 7



UHF-VHF TUNER AND VIDEO IF STRIP USED ON CHASSIS 18SXB4BZ

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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L. L. WINKLEMAN
3076 MEADE ST.
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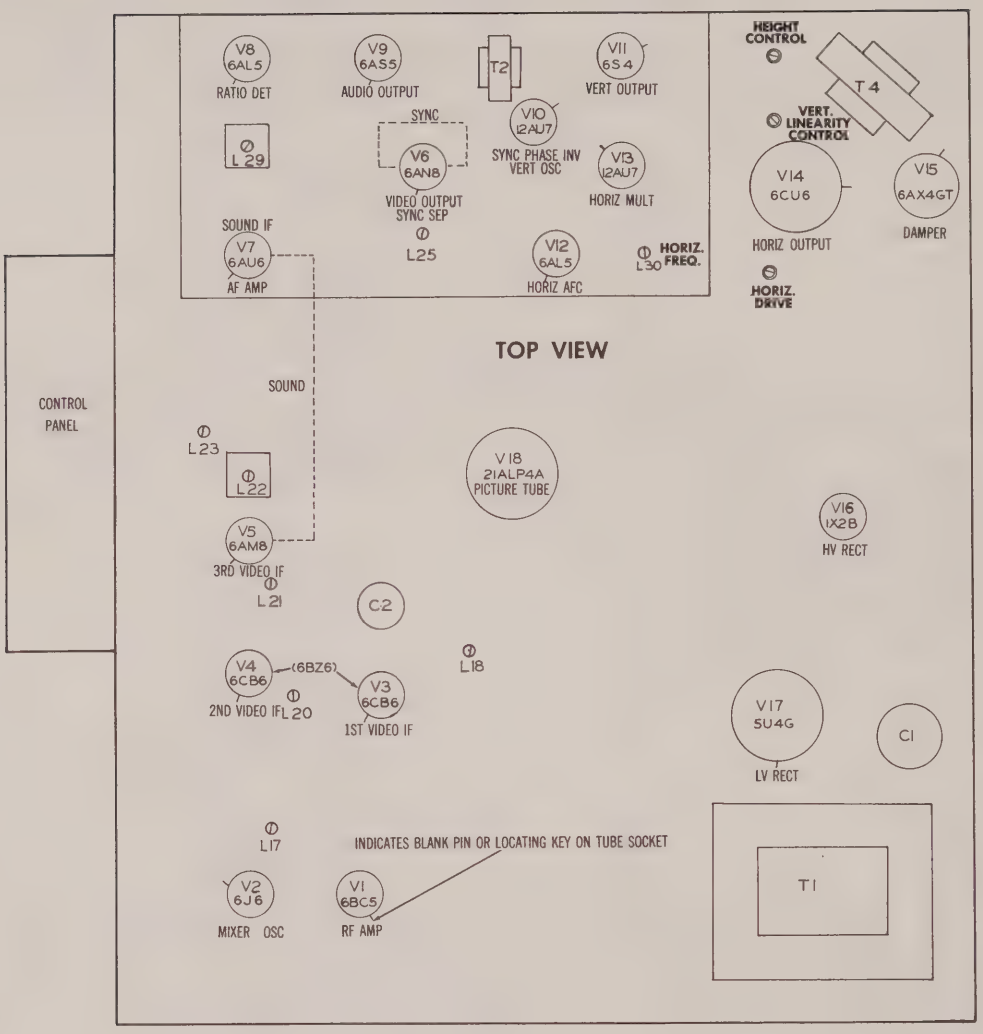
ALTERNATE TUNER SCHEMATIC

ADMIRAL CHASSIS 18SX4BZ, 18X4CZ, 18X4EZ, 18X4FZ, 18Z4GZ, 18XP4BZ

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V17

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster -V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V8
No pic, has sound, has raster - V6, V18
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V10
No horiz. sync - V10, V12, V13
No vert. or horiz. sync - V6, V10

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V16, V18
No vertical deflection - V10, V11
Poor vert. linearity or foldover - V10, V11
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, V16, V17
Vert. off freq. - V10
Horiz. off freq. - V10, V12, V13

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1. 3Meg	0Ω	. 1Ω	0Ω	■500Ω	■1. 5KΩ	0Ω		
V 2	6J6	■15KΩ	■7KΩ	. 1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	470KΩ	47Ω	0Ω	. 1Ω	▲1KΩ	▲1KΩ	0Ω		
V 4	6CB6	100KΩ	▲68Ω	0Ω	. 1Ω	†1KΩ	†1KΩ	INF		
V 5	6AM8	120Ω	. 4Ω	■8. 2KΩ	0Ω	. 1Ω	■1KΩ	. 2Ω	5. 6KΩ	0Ω
V 6	6AN8	†130KΩ	2. 5Meg	0Ω	. 1Ω	0Ω	†5. 6KΩ	†40KΩ	1Meg	300Ω
V 7	6AU6	90KΩ	0Ω	. 1Ω	0Ω	†27KΩ	■330Ω	220Ω		
V 8	6AL5	INF	INF	. 1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 9	6AS5	40KΩ	350KΩ	. 1Ω	0Ω	350KΩ	†550Ω	†800Ω		
V 10	12AU7	◓1. 5Meg	1. 5Meg	0Ω	0Ω	0Ω	†7KΩ	800KΩ	2. 2KΩ	. 1Ω
V 11	6S4	NC	2. 2KΩ	1Meg	0Ω	. 1Ω	1Meg	NC	NC	◓5KΩ
V 12	6AL5	15Ω	15Ω	. 1Ω	0Ω	4. 8Meg	0Ω	4. 8Meg		
V 13	12AU7	†5. 7KΩ	5Meg	1. 5KΩ	. 1Ω	. 1Ω	†100KΩ	150KΩ	1. 5KΩ	0Ω
V 14	6CU6	TP	. 1Ω	NC	†15KΩ	470KΩ	NC	0Ω	0Ω	Top Cap ◓11. 5Ω
V 15	6AX4GT	TP	NC	140KΩ	NC	†55Ω	NC	. 1Ω	0Ω	
V 16	1X2B		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ◓470Ω
V 17	5U4G	NC	60KΩ	NC	23Ω	TP	25Ω	TP	60KΩ	
V 18	21ALP4A	0Ω	56KΩ	Pin 6 0Ω	Pin 10 ◓4. 7KΩ	Pin 11 ■200KΩ	Pin 12 . 1Ω			

■ MEASURED FROM 140V LINE
▲ MEASURED FROM PIN 7 OF V4
† MEASURED FROM PIN 8 OF V17
◓ MEASURED FROM PIN 3 OF V15
NC - NO CONNECTION
TP - TIE POINT

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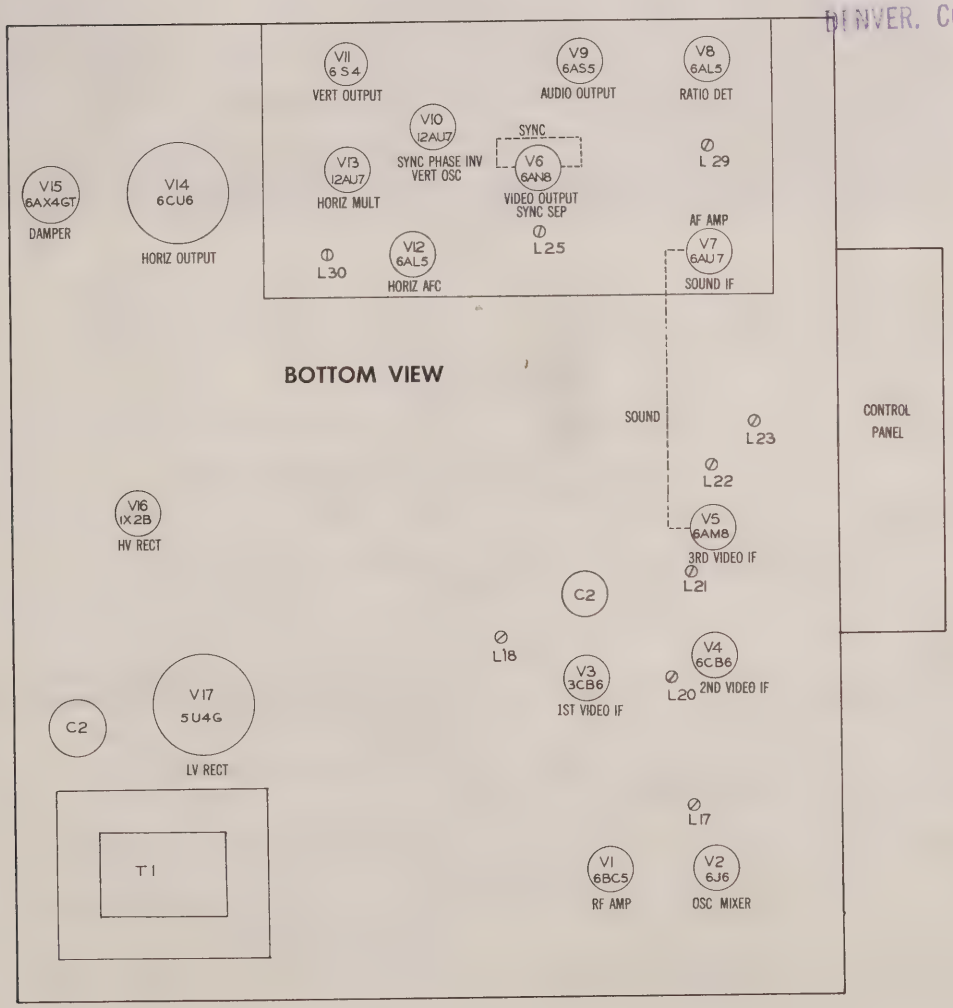


TUBE PLACEMENT CHART

SET 280 FOLDER 2

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V14, V15 and V17. Check adjustment B2. Check C72, C69, R87, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V14 and V15. Check adjustment B2. Check T3, T5A, R82, R87 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V14 and V15. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V13, V14 and V15. Check C67 for open. Check L30, R80, C66, C69 and other associated components.

XMAS TREE EFFECT

Check by substitution V13, V14 and V15. Check T3 and T5 for internal arcing. Check L30, C74, C69, C68, R80, R82, R90 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V10 and V11. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R71, C5 and other associated components.	Check T2, R66, R67, R5, C62 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V10 and V11. Check height and vertical linearity controls for proper operation. Check R67, T4 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V10 and V11. Check R67, R5, R70, R71, C62 and other associated components.

COMPRESSED AT TOP

Check by substitution V10 and V11. Check R6, R70, R71, T4 and other associated components.

FOLDS

Check by substitution V10 and V11. Check C60, C61, C62, T4, R68, R71 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V10. Check C55, C56, C57, R63, R58, R59 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V10. Check vertical integrator network. Check C59, T2, R66, R3 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V12 and V13. Check C64, C65, C68, C69, L30, R75, R76, R80 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V10, V12 and V13. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C40, C42, R38, R40, R37 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A15. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control. Check L26, L27, C40, C42 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check L23, R34, C40, C42 and other associated components.

SMEAR

Substitute V6. Check L23, L24, L26, L27, C40, C42 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stage V9 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C52, C53, C54, C4, C2B, R55, R53, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A14 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

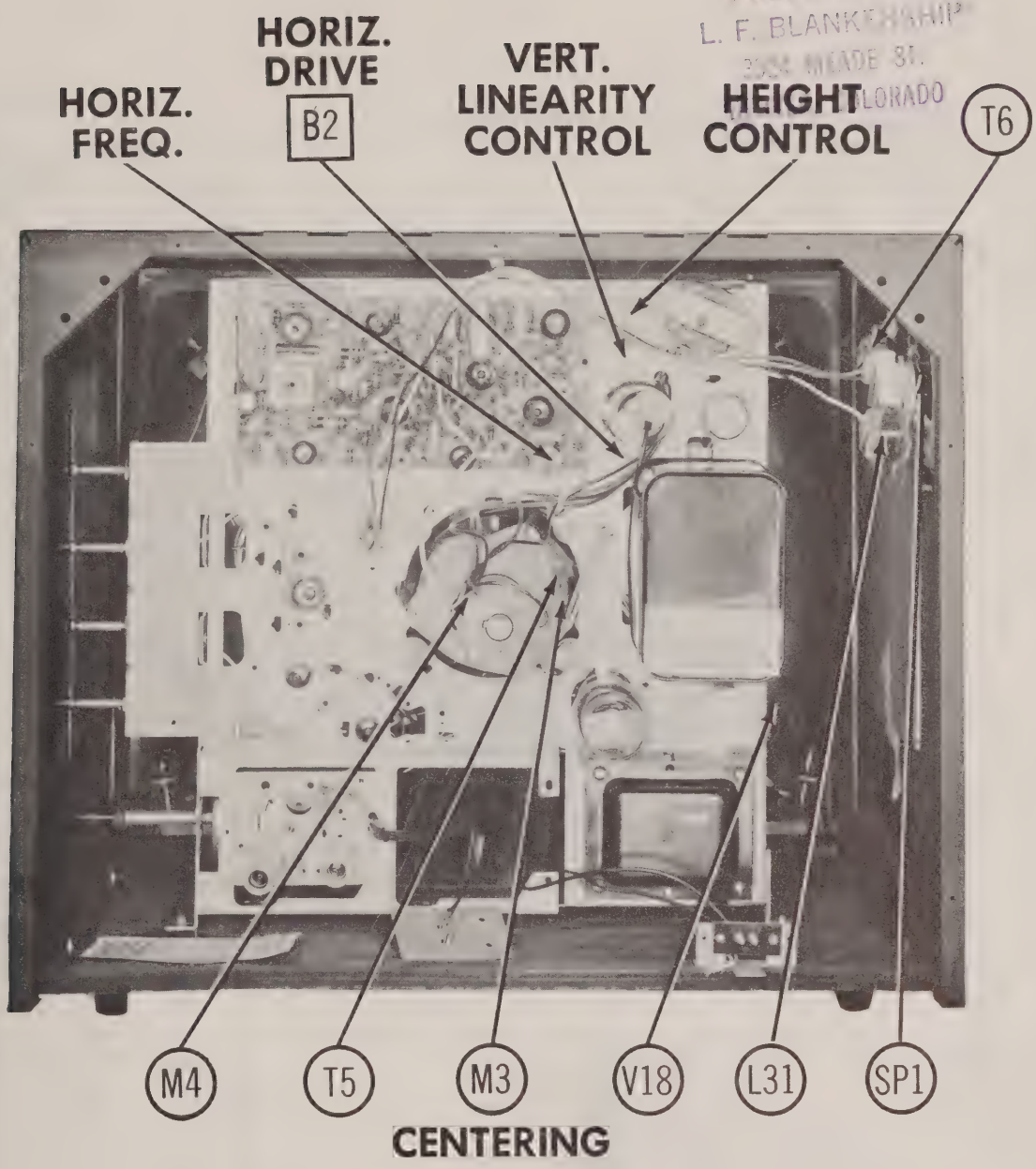
DEAD SET

IF filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V17. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V17. Check B+ filter and decoupling network.

PROPERTY OF
L. F. BLANKENSHIP
2554 MEADE ST.
LORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably a test pattern.
2. Set the brightness and contrast control for normal picture.
3. Turn the horizontal oscillator slug (B1) clockwise until the picture loses sync. It may be necessary to switch off channel momentarily for picture to lose sync.
4. Turn B1 slowly counter clockwise until picture just falls into sync.
5. Turn to an unusual channel . If vertical lines appear near the center of the screen slowly adjust the horizontal drive trimmer (B2) until the white lines disappear.
6. If in step 5 the horizontal drive was adjusted, tune in a station and repeat steps 3 and 4. Check horizontal sync by switching off channel, then back.

PROPERTY OF
MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: ADMIRAL PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6DC5	6DC5	7BD	
V2	Osc.-Mixer	6J6	6J6	7BF	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	6B26 used in chassis 18X4EZ, 18X4FZ, 18X4GZ
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	6B26 used in chassis 18X4EZ, 18X4FZ 18X4GZ
V5	3rd. Video IF Amp., Video Detector	6AM8	6AM8	9CY	
V6	Video Output-Sync Separator	6AN8	6AN8	9DA	
V7	Sound IF Amp. - AF Amplifier	6AU6	6AU6	7BK	
V8	Ratio Detector	6AL5	6AL5	6BT	
V9	Audio Output	6A35	6A35	7CV	
V10	Sync Phase Inv.-Vert. Osc.	12AU7	12AU7	9A	
V11	Vert. Output	6S4	6S4	8AC	
V12	Horiz. AFC	6AL5	6AL5	6BT	
V13	Horiz. Mult.	12AU7	12AU7	9A	
V14	Horiz. Output	6CU6	6CU6	8BD	
V15	Damper	6AX4GT	6AX4GT	4CG	
V16	HV Rectifier	1X2B	1X2B	9Y	
V17	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ADMIRAL PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V18	21ALP4A ① 24DP4A	21ALP4A ② 21ALP4	21ALP4A ① 21ALP4	21ALP4A④ ① 21ALP4 24DP4A ① 24DP4	21ALP4A ① 21ALP4 24DP4A ① 24DP4	12L 12L 12L 12L	① Aluminized

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: ADMIRAL PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	+60	350	67D15-11D				TM-60060-350	D-177	
B	+100	350							
C2A	+5	200	67D15-109			FP21T.8	TM-3123	T-393	
B	+60	200				TC50K		M7-2509	
C	20	50							
C3	4	50	67A4-9			TC50	TD-4-50	FM-1504	
C4	40	300	67A4-21			TC88	TD-40-250	FM-2540	Note 1
C5	10	475	67A4-22			TC83	TD-10-475	S-310	
C6	7.5		94D77-78						
C7	1000		94D77-88						
C8	800		94D77-84		80I-001	DC-521			
C9	150		94D77-81		D6-151	81I-151		DC-5315	
C10	1		94D77-86		TC2-1	N90A-010			
C11	47		94D77-77		D6-470	831-470		UC-5447	
C12	.5-3		94D77-83		839-3	815-01-0R5		C7565A	
C13	1.2		94D77-87		TC2-1.2	N90A-1R2			
C14	27		94D77-79						
C15	27		94D77-79						
C16	800		94D77-84		D2-801	801-001		DC-521	
C17	10		94D77-76		TCN-10	N750K-100		NT-541	
C18	150		94D77-81		D6-151	81I-151		UC-5315	
C19	1000		94D77-85						
C20	1000		94D77-88						
C21	2.2				TC2-2.2	N90A-2R2		ZT-5522	
C22	15		85C6-90		TC2-15	N90K-150		ZT-5415	
C23	5000				D2-503	81I-005		DC-525	
C24	.22	100					IMP2-P22	P7401	3302022
C25	.01	400			D6-103	GP2-103-103	IMP4-S1	83041	
C26	.1	200			DP-104		IMP2-P1	P7401	330201
C27	5000				D2-503	81I-005		DC-525	Note 2
C28	5000				D2-503	81I-005		DC-525	
C29	.22	200					IMP2-P22	P7402	3302022
C30	1000				D2-102	801-001		DC-521	
C31	5000				D2-503	81I-005		DC-525	
C32	5000				D2-503	81I-005		DC-525	
C33	5000				D2-503	81I-005		DC-525	
C34	5000				D2-503	81I-005		DC-525	Note 7
C35	5000				D2-503	81I-005		DC-525	
C36	5000				D2-503	81I-005		DC-525	
C37	5000				D2-503	81I-005		DC-525	
C38	5000				D2-503	81I-005		DC-525	Note 7
C39	7		65B38-08S		TCZ-6.8	N90A-6R8		ZT-5568	
C40	.1	200	64B18-30					360004	
C41	7		65B38-08S		TCZ-6.8	N90A-6R8		ZT-5568	
C42	.22	400	64B18-28					360008	
C43	10		85C6-44		TCZ-10	N90K-100		ZT-541	
C44	20		85C6-51		TCZ-20	N90K-200		ZT-542	
C45	1000		64B18-42		D6-102	GP2L-102		UC-521	
C46	.0047	400	64B18-38					K-1210	360006
C47	180		85C6-59						
C48	500		85C39-3		D6-501	GP2K-501		UC-525	
C49	.001	400	85C39-1					K-1350	360005
C50	.047	200	64B18-32					360003	
C51	1000		85C39-1		D6-102	GP2L-102		K-1210	
C52	.01	600	64B18-36					UC-521	360009
C53	.01	400	64B18-36						360007
C54	5000				DD-502	81I-005		DC-525	C-1250
C55	150		85C39-4		D6-151	GP2K-151		UC-5315	K-1315
C56	10000				DD-103	81I-01		DC-511	
C57	.1	400							360001 Note 3
C58A	2000							DC-522	
B	5000		+63B6-9			+1405-01		DC-525	
C	5000							DC-525	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: ADMIRAL PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No	SANGAMO PART No	NOTES
C59	4700	500	65B21-472			MCB465		CR-1247	
C60	.047	400						360002	
C61	.047	400						360011	
C62	.047	500						360010	
C63A	10000		‡63C6-12		81-01	DC-5U			
B	10000				81I-01	DC-5U			
C64	.001	400			D6-102	GP2L-102	IMP6-D1	830821	
C65	.001	400			D6-102	GP2L-103	IMP6-D1	830821	
C66	.0047	400	64B18-38					360006	
C67	.015	200						360002	
C68	3300	500	65B21-332			MCB463		CR-1239	
C69	390	500	65B21-391			MCB343		KR-1339	
C70	680	500	65B21-681					KR-1368	
C71	.047	600			DF-503	PT6147	IMP6-S47	3306147	
C72	.1	600			DP-104	PT601	IMP6-P1	330601	
C73	.75	.3000	65C10-57		DD30-750				Note 4
C74	.047	600			DF-503	PT6147	IMP6-S47	3306147	
C75	.75		65C10-54		DD30-750				Note 5
C76	500								Note 6

* Items C58A, C58B, C58C, R65A, R65B, and R65C are combined in one unit.
† Items C63A, C63B, R72A and R72B are combined in one unit.
Note 1: Some versions use a 300V unit in this application (part #67A4-19).
Note 2. Not used in chassis 18X4EZ, 18X4FZ, 18X4GZ and 18X4CZ
Note 3. Chassis 18X4EZ, 18X4FZ and 18X4GZ use .01MFD in this application.
Note 4. Chassis 18X4EZ, 18X4FZ and 18X4GZ use 230MMF in this application (part #65C10-66).
Note 5. Chassis 18X4EZ, 18X4GZ and 18X4GZ use 150MMF in this application (part #65C10-68).
Note 6. Not used in chassis 18X94BZ.
Note 7. Chassis 18X84BZ uses 800MMF in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: ADMIRAL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	1	73C3-31	Q13-137	A47-1Meg-Z	AB-744	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	T6-1	SWE-13	KB-1	U8-26	Attach to R1A
R2A	100Ω	½	73C13-46	Q7-103		AB-505	U-3	Contrast
B	Shaft		Not Req.	Not Req.		AK-4	Not Req.	Attach to R2A
R3A	2.5Meg	½	73C12-45	Q11-158	A47-1.5Meg-S	AK-75	U-355	Vert. Hold - Note
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R3A
R4A	100KΩ	½	73C13-43	Q11-158	A47-100K-S	AB-40	U-41	Brightness
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R4A
R5A	2.5Meg	½	75C30-1	Q11-239	A47-2.5Meg-S	BK-85	U-355	Height
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R5A
R6A	3000Ω	½	73C20-7	Q11-13	A47-3000-S	AB-8	U-8	Vert. Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A

Note: Some versions may use an alternate control part no. 75C30-65.

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: ADMIRAL PART No.	IRC PART No.	NOTES
R7	12KΩ	½		BTS-12K	
R8	1000Ω	½		BTS-1000	
R9	220KΩ	½		BTS-220K	
R10	15KΩ	½		BTS-15K	
R11	6800Ω	½		BTS-6800	
R12	10KΩ	½		BTS-10K	
R13	10KΩ	½		BTS-10K	
R14	18KΩ	½		BTS-18K	
R15	470Ω	½		BTS-470	
R16	15Meg	½		BTS-15Meg	
R17	100KΩ	½		BTS-100K	Note 1
R18	1Meg	½		BTS-1Meg	
R19	470KΩ	½		BTS-470K	
R20	270KΩ	½		BTS-270K	
R21	1000Ω	½		BTS-1000	
R22	3000Ω 5%	½	60B7-302	BTS-3000 5%	
R23	47Ω	½		BTS-47	
R24	16KΩ 5%	½	60B7-163	BTS-16K 5%	
R25	1000Ω	½		BTS-1000	
R26	220KΩ	½		BTS-220K	
R27	330KΩ	½		BTS-330K	
R28	68Ω	½		BTS-68	
R29	10KΩ 5%	½	60B7-103	BTS-10K 5%	
R30	1000Ω	½		BTS-1000	
R31	130Ω	½		BTS-130	
R32	8200Ω	½		BTS-8200	
R33	1000Ω	½		BTS-1000	
R34	5600Ω	½		BTS-5600	
R35	1Meg	½		BTS-1Meg	
R36	100Ω	½		BTS-100	
R37	470Ω	½		BTS-470	Note 2
R38	39KΩ	1	60B14-393	BTA-39K	
R39	5600Ω	2	60B20-562	BTB-5600	
R40	15KΩ	½		BTS-15K	
R41	270KΩ	½		BTS-270K	
R42	180KΩ	½		BTS-180K	
R43	220Ω	½		BTS-220	
R44	330Ω	½		BTS-330	
R45	37KΩ	2	60B30-373	BTB-37K	
R46	10KΩ	½		BTS-10K	
R47	33KΩ	½		BTS-33K	
R48	47KΩ	½		BTS-47K	
R49	10KΩ	½		BTS-10K	
R50	10KΩ	½		BTS-10K	

ITEM No	RATING: OHMS	WATT	REPLACEMENT DATA: ADMIRAL PART No.	IRC PART No.	NOTES
R51	390Ω	½		BTS-390	
R52	2200Ω	½		BTS-2200	
R53	150Ω	½		BTS-150	
R54	820KΩ 5%	½	60B7-824	BTS-820K 5%	
R55	470Ω	½	60B20-471	BTB-470	
R56	680KΩ 5%	½	60B7-684	BTS-680K 5%	
R57	2.2Meg	½		BTS-2.2Meg	
R58	330KΩ	½		BTS-330K	
R59	47KΩ	½		BTS-47K	
R60	3.9Meg	½		BTS-3.9Meg	
R61	1Meg	½		BTS-1Meg	
R62	2200Ω	½		BTS-2200	
R63	4700Ω	½		BTS-4700	
R64	2200Ω	½		BTS-2200	
R65A	22KΩ	½		BTS-22K	
B	8200Ω	½	‡63B6-9	BTS-8200	
C	8200Ω	½		BTS-8200	
R66	820KΩ	½		BTS-820K	
R67	1Meg 5%	½	60B7-105	BTS-1Meg 5%	
R68	12KΩ	½		BTS-12K	
R69	1Meg	½		BTS-1Meg	
R70	820Ω	½		BTS-820	
R71	4700Ω	½	60B20-472	BTS-4700	
R72A	2700Ω	½	‡63C6-12	BTS-2700	
B	56KΩ	½		BTS-56K	
R73	560Ω	½		BTS-560	
R74	560Ω	½		BTS-560	
R75	100K Ω 5%	½	60B7-104	BTS-100K 5%	
R76	100K Ω 5%	½	60B7-104	BTS-100K 5%	
R77	4.7Meg	½		BTS-4.7Meg	
R78	470KΩ	½		BTS-470K	
R79	1500Ω	½		BTS-1500	
R80	5600Ω	½		BTS-5600	
R81	150KΩ	½		BTS-150K	
R82	100KΩ	½		BTS-100K	
R83	5600Ω	½		BTS-5600	
R84	100Ω	½		BTS-100	
R85	470KΩ	½		BTS-470K	
R86	100Ω	½		BTS-100	
R87	15KΩ	3		BTB-15K	Note 3
R88	750Ω	½			Note 4
R89	470KΩ	½		BTS-470K	
R90	15Ω	1	60B14-150		
R91	4.7Ω	½			Note 5

* Items R65A, R65B, R65C, C58A, C58B and C58C are combined in one unit.
† Items R72A, R72B, C63A and C63B are combined in one unit.
Note 1: Used in chassis 18XP4BZ only.
Note 2: Chassis 18X4FZ, 18X4EZ, 18X4GZ and 18X4CZ use a 1000Ω resistor in this application.
Note 3: Chassis 18X4FZ, 18X4EZ and 18X4GZ use a 8200Ω 2 watt resistor in this application.
Note 4: Chassis 18X4FZ, 18X4EZ and 18X4GZ use a 2700Ω resistor in this application.
Note 5: Used in chassis 18X4EZ, 18X4GZ, 18X4FZ and 18X4CZ only.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: ADMIRAL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No	Halldorson PART No	Thordarson PART No
T1	117VAC ②1.44A	550VCT ②.330ADC ③A	5VAC ④9A	80C35-1 80C35-2 ③	P-8184	P-3077 ①	R-61DC ① ④		P8133	26R33 ①
	SEC. 3 ②.7.8A	SEC. 4	SEC. 5							
	6.3VAC ②.7.8A									

① File out mounting slots if necessary.
② Tape 6.3V ② 1:2 A winding, parallel and phase 6.3V ② 6A windings for Sec. #3.
③ Tape extra 5V winding and parallel and phase 6.5V windings for Sec. #3.
④ Power transformer used in Model 18SX4DZ

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor TYPE No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	79B68-7	B6702 ①	A-3003 ①			V405 ①	A-8225 ①	A-97X ①
T3	Horiz. Output Trans.	79C60-3 ②	H430*					A-8255*	
T4	Vert. Output Trans.	79B43-4	21806	A-3039		V312	A-8141	26S54	A-109X ③
T5A	Yoke (90°) Horiz. (18.5MH)	94D74-5 ④	DF601 ⑤ ⑥					Y-16 ⑤ ⑥	
B	Vert. (40MH)	94C74-5 ⑤⑥ 94C74-7 ⑤⑥ 94A71-1 ⑦							

① Cut and bend frame to duplicate original, or use original frame.
② Used in chassis 18XP4BZ and 18X84BZ only. Chassis 18X4EZ, 18X4FZ and 18X4GZ use Admiral part no. 79C60-6 in this application.
③ Connect as auto trans.
④ Used in chassis 18XP4BZ and 18X84BZ only. Chassis 18X4EZ, 18X4FZ and 18X4GZ use Admiral part no. 94D87-2 in this application.
⑤ Includes capacitor C75; resistors R73, R74 & R85.
⑥ Alternate deflection yoke for chassis 18XP4BZ and 18X84BZ.
⑦ Yoke cover and centering device.
Use original yoke cover and centering device.
See instructions packed with unit pertaining to yoke damping network.
⑩ Connect horiz. yoke damping network across terminals #3 & #7. Use original network if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	5				5		
2	4				4		
1	1				1		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	ADMIRAL PART No.	REPLACEMENT DATA: Stancor PART No.	Merit PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T6	4.2KΩ	3.7Ω	Part of speaker		A-3026		S-6X	

SPEAKER

	RATINGS: SIZE	FIELD	V C IMP	ADMIRAL PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	4	PM	3.7Ω	78SH01-1 ①	Mod. P4-X	4A07	① This part number may be on 4" EM speaker also.

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: ADMIRAL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Trans.	.10CT	0Ω#					# Tapped
L2	Ant.-Coils	0Ω						
L3	Ant. Coil	0Ω						Channel 13
L4	RF Choke	0Ω						
L5	RF Coils	0Ω						
L6	RF Coil	0Ω						Channel 13
L7	Bi-Band Coupling Strap	0Ω						
L8	Mixer Grid Coil	0Ω						
L9	Mixer Grid Coil	0Ω						Channel 13
L10	Osc. Coil	0Ω						Channel 2
L11	Osc. Coil	0Ω						Channel 3
L12	Osc. Coil	0Ω						Channel 4
L13	Osc. Coil	0Ω						Channel 5
L14	Osc. Coil	0Ω						Channel 6
L15	Osc. Coils	0Ω						Channel 7 thru 13
L16	Osc. Coil	0Ω						Channel 13
L17	1st. Video IF	.5Ω						
L18	27.25MC Trap	0Ω		72D111-29	30-1006		6171A	
L19	Fil. Choke	0Ω		72A3-5	19-1002	TV-189	6175	.6 Microhenry
L20	2nd. Video IF	.4Ω	.4Ω	72D111-28	17-1063	TV-102 *	6350	
L21	3rd. Video IF	.4Ω	.4Ω	72D111-28	17-1063	TV-102 *	6350	
L22	4th. Video IF	.5Ω	.2Ω	72B143-3	17-1001 ⊠	TV-100 ⊠	6166 ⊠	
L23	Series Peaking Coil	5Ω		72A5-7	19-3180 ▲	TV-184 ▲	6180 ▲	180 Microhenries, wound on 4.7KΩ resistor

ADMIRAL CHASSIS 18SX4BZ, 18X4CZ, 18X4EZ, 18X4FZ, 18Z4GZ, 18XP4BZ

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ADMIRAL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L24	Shunt Peaking Coil	16Ω		73A5-15	19-3500		6174	510 Microhenries
L25	4.5MC Trap	4.6Ω		72A132				
L26	Series Peaking Coil	6.5Ω		73B5-21	19-3300 ▲	TV-185 ▲	6155 ▲	280 Microhenries, wound on 33KΩ resistor
L27	Shunt Peaking Coil	8Ω		73B5-22	19-4412	TV-190 †	4648 †	375 Microhenries, wound on 10KΩ resistor
L28	Sound IF	4.4Ω		72B99-14	20-1005	TV-151	1470	
L29	Ratio Det.	3.6Ω	.3ΩCT	72C68-4	17-1033 ♦	TV-110 ♦	1468 ♦	Tertiary winding-.8Ω
L30	Horiz. Osc.	53Ω		94C17-4				

* Enlarge mounting hole.
■ Detune trap winding.
▲ Parallel with 4.7KΩ resistor.
▲ Parallel with 33KΩ resistor.
† Parallel with 10KΩ resistor.
♦ Remove spade bolts.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA ADMIRAL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L31	.230ADC	54.5Ω	1.3 Hy.	Part of Spkr.					

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M1	Tuner	94D77-1	VHF - Chassis 18XP4BZ, 18XP4HZ
	Tuner	94D46-5	VHF - Chassis 18X4CZ
	Tuner	94D46-6	VHF - Chassis 18X4EZ, 18X4FZ, 18X4GZ
	Tuner	94D46-7	VHF - Chassis 18X4EZ, 18X4FZ, 18X4GZ
	Tuner	94D46-8	VHF - Chassis 18X4EZ, 18X4FZ, 18X4GZ
M2	Tuner	94E75-2	VHF-UHF - Chassis 18SX4BZ, 18SX4EZ, 18SX4FZ, 18SX4GZ
M3	Centering Device	94A71-1	
M4	Ion Trap	94A15-4	
B2	Trimmer Cap.	66A30-3	Horiz. Drive (178-780MMF)
	Cabinet	34E83-1	Models T2301Z, TS2301Z, TS2302Z, TS2326Z, TS2327Z
	Cabinet	34E83-2	Model T2302Z
	Cabinet	35E316-2	Model T2326Z
	Cabinet	35E316-3	Model T2327Z
	Knob	33A143-1	On-Off-Volume, Contrast, Vert. and Brightness - Model T2301Z
	Knob	33A143-5	On-Off-Volume, Contrast, Vert. and Brightness - Model T2302Z
	Knob	33A143-3	On-Off-Volume, Contrast, Vert. and Brightness - Model T2326Z
	Knob	33A143-2	On-Off-Volume, Contrast, Vert. and Brightness - Model T2327Z
	Knob	33D143-1	On-Off-Volume, Contrast, Vert. and Brightness - Model TS2301Z
	Knob	33D143-5	On-Off-Volume, Contrast, Vert. and Brightness - Model TS2302Z
	Knob	33D143-3	On-Off-Volume, Contrast, Vert. and Brightness - Model TS2326Z
	Knob	33D143-2	On-Off-Volume, Contrast, Vert. and Brightness - Model TS2327Z
	Knob	33D144-1	VHF Channel Sel. - Model T2301Z, T2327Z
	Knob	33D144-6	VHF Channel Sel. - Models T2302Z, T2326Z
	Knob	33D144-2	VHF Fine Tuning - Models T2301Z, T2327Z
	Knob	33D144-7	VHF Fine Tuning - Models T2302Z, T2326Z
	Knob	33B146	UHF Channel Sel. - Models TS2301Z, TS2302Z, TS2326Z, TS2327Z
	Knob	33D144-3	VHF Channel Sel. - Models TS2301Z, TS2327Z
	Knob	33D144-8	VHF Channel Sel. - Models TS2302Z, TS2326Z
	Knob	33D144-4	Fine Tuning - Models TS2301Z, TS2327Z
	Knob	33D144-9	Fine Tuning - Models TS2302Z, TS2326Z
	Safety Glass	21B62-11	All Models (21" tubes)
	Mask	23D205-2	All Models (21" tubes)

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TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15 and V16. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C73, C72, C71, R87 and other associated components.	Check L30, C68, C69, R82, R80 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V14, V15 and V17. Check C72, C69, R87 and other associated components.

BLOOMING

Check by substitution V14, V15, V16 and V17. Check T3, R87 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5,V6 and V9. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

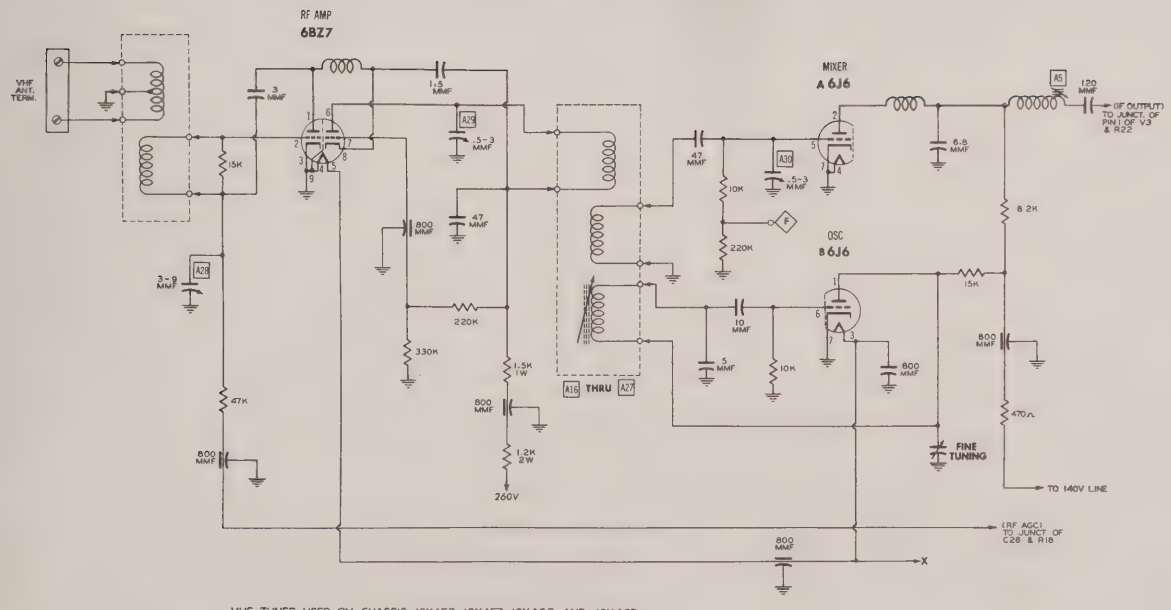
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



VHF TUNER USED ON CHASSIS 18X4EZ, 18X4FZ, 18X4GZ, AND 18X4CZ

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALTERNATE TUNER SCHEMATIC

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 4 wood screws holding metal strip at the top of safety glass. Remove metal strip and safety glass. Use extreme catuion when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 10.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made by adjusting the flexible shaft at back of set. Adjust horizontal frequency slug of L30 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate "Sound IF Detector Buzz" adjust the Ratio Detector Secondary (L29) located on bottom of chassis. Adjustment can be made from top of chassis by inserting alignment tool thru hollow hex slug (primary adjustment) to bottom adjustment (A8) on L29.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 6 push-on type control knobs from side panel of cabinet.
2. Remove 7 wood screws. Remove rear cover.
3. Remove 2 metal screws from antenna bracket.
4. Remove 2 metal screws from interlock bracket.
5. Disconnect speaker plug.
6. Remove 5 chassis bolts. Lift cabinet from mounting board and slide forward.
7. Remove 2 speaker nuts. Remove speaker.

NOTE: If it is necessary to remove the chassis for servicing, it is also necessary to remove the speaker. The filter choke and the audio output transformer is mounted on the speaker and must be connected to receiver for proper operation.

PRODUCTION CHANGES

Admiral chassis 18XP4HZ is identical to chassis 18XP4BZ, except for the changes listed below.

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R17 is omitted.

C27 is omitted.

R22 is increased from 2KΩ to 3.9KΩ.

R24 is decreased from 16KΩ to 12KΩ .

C30 is increased from 1000MMF to 5000MMF.

R28 is decreased from 68Ω to 47Ω.

R29 is decreased from 10KΩ to 6.2KΩ.

C31 is omitted.

R37 is increased from 470Ω to 1KΩ.

R38 is decreased from 39KΩ to 33KΩ.

C57 is decreased from .1MFD to .01MFD.

R87 is decreased from 15KΩ to 8.2KΩ.

C75 is increased from 75MMF to 230MMF.

R88 is decreased from 750Ω to 270Ω.

L19 is omitted.

A 5000MMF capacitor is added from pin 4 of V3 to ground.

A high voltage filament resistor (4.7Ω) is added.

C73 is increased from 75MMF to 150MMF and is disconnected from pin 3 of V15, and reconnected to the junction of C75 and R88.

The 2nd. video IF coil (L20) is changed to part #72C132-2.

The 3rd. video IF coil (L21) is changed to part #72C132-2.

The 4th. video IF coil (L22) is changed to part #72B152-2.

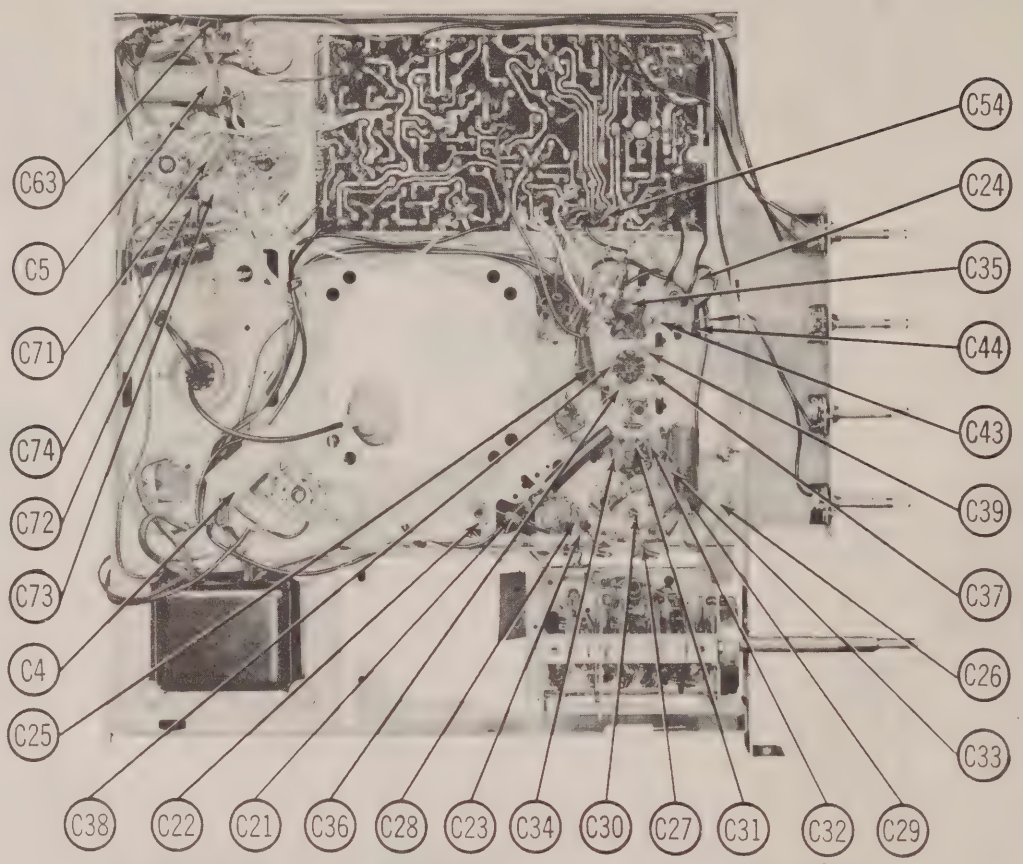
The vertical oscillator transformer (T1) is changed to part #79B63-3.

The deflection yoke (T5A, T5B) changed to part #94D87-1.

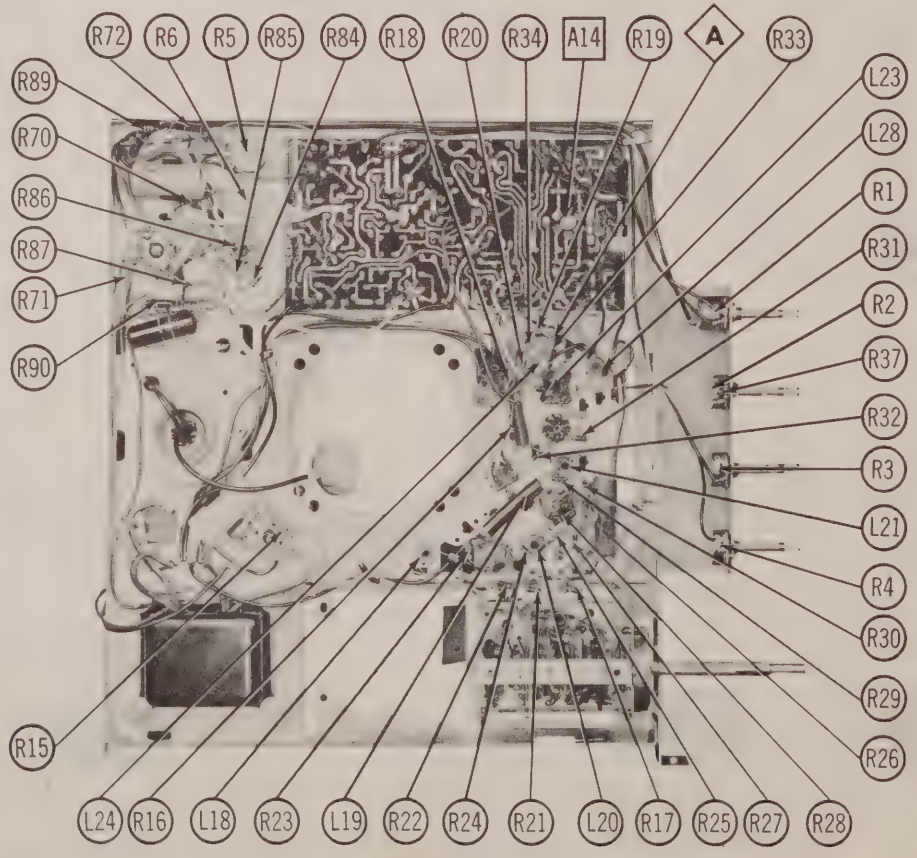
The horizontal output transformer (T3) is changed to part #79C60-6.

A PM speaker may be used in some models.

A peaking coil (part #73A24-2) is added between pin 8 of V5 and L23.



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

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MODEL WG-5100A

AIRLINE
MODEL WG-5100A

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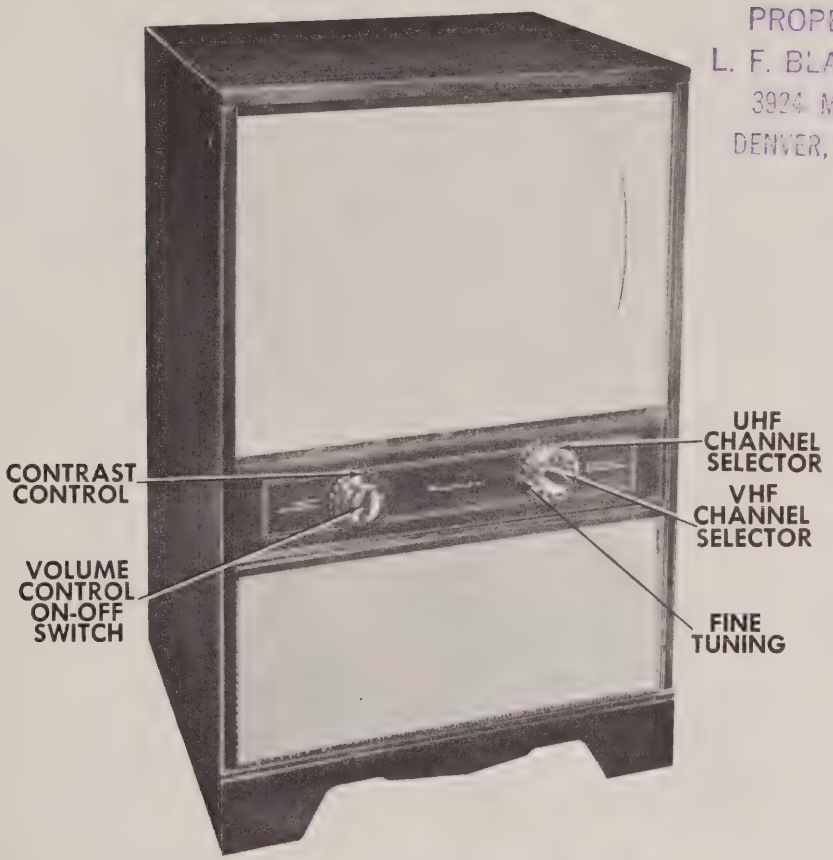

AIRLINE MODEL WG-5100A

TRADE NAME	Airline Models WG-5100A, WG-5100B
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Television Receiver
TUBES	Twenty-one
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.5 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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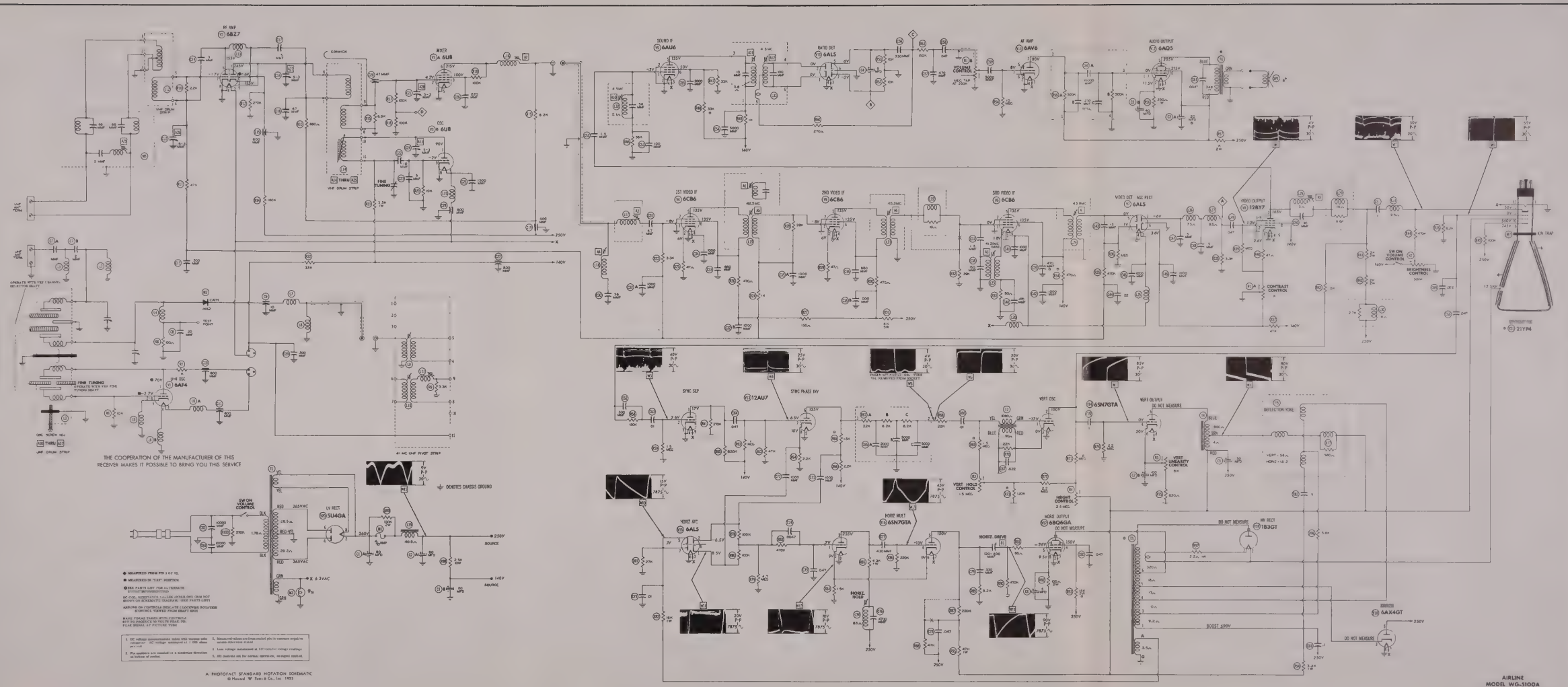
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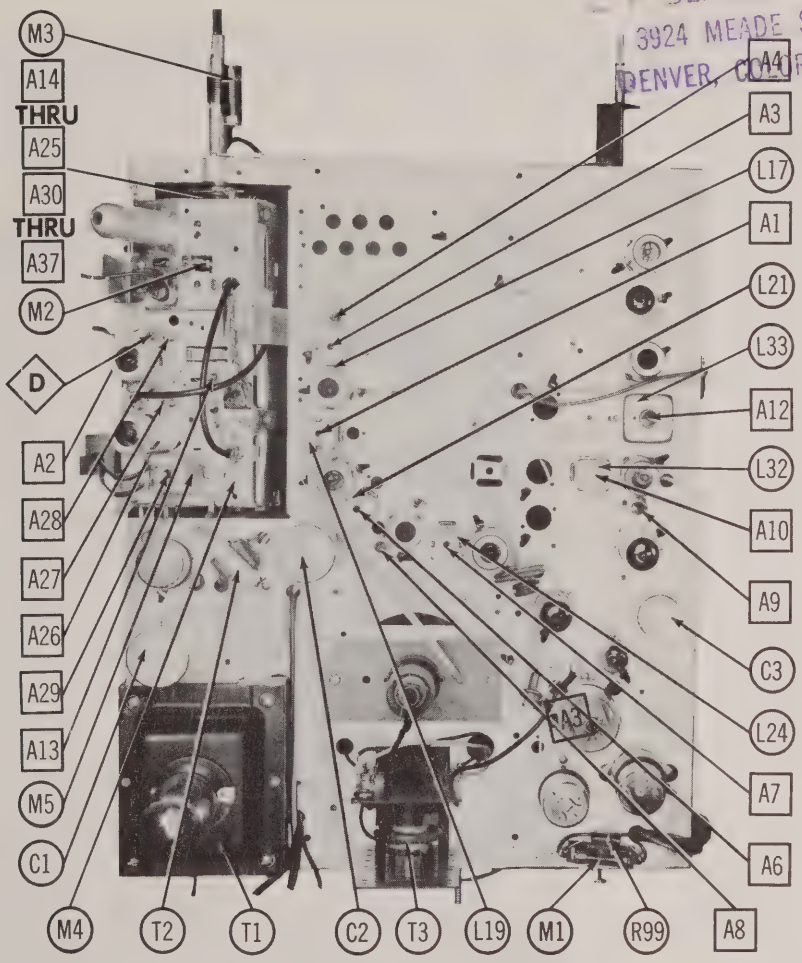
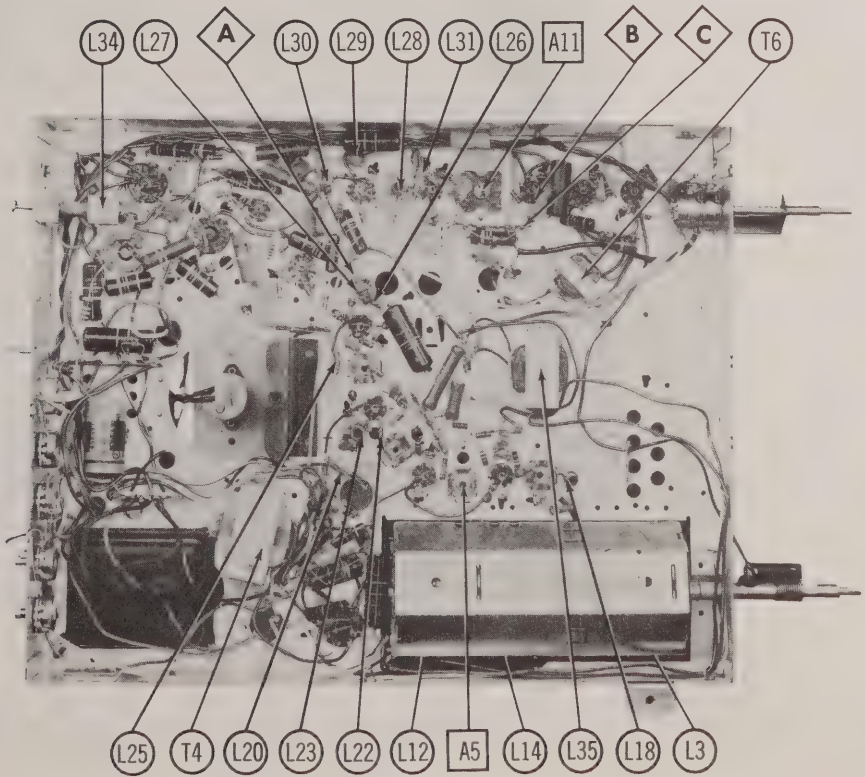
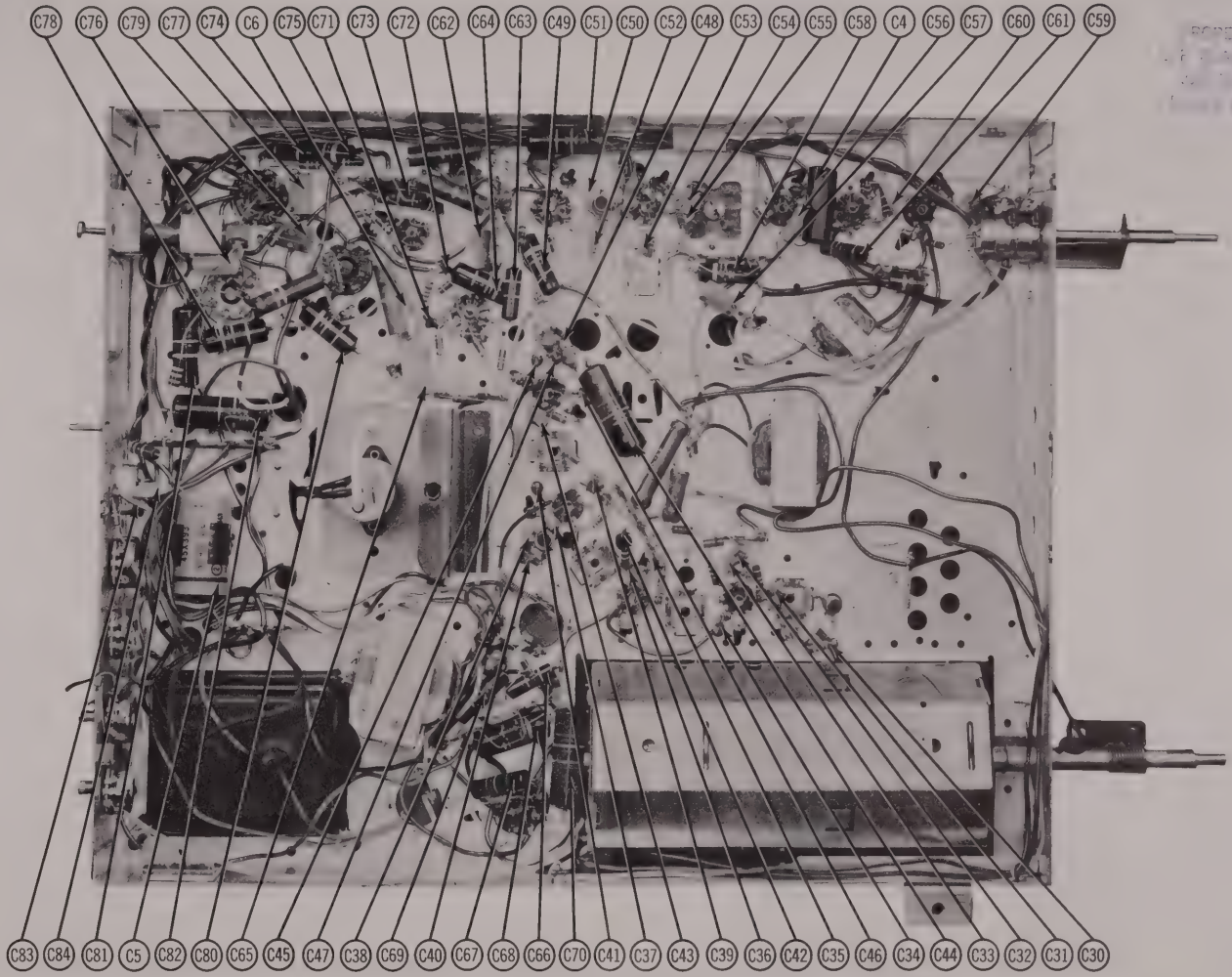


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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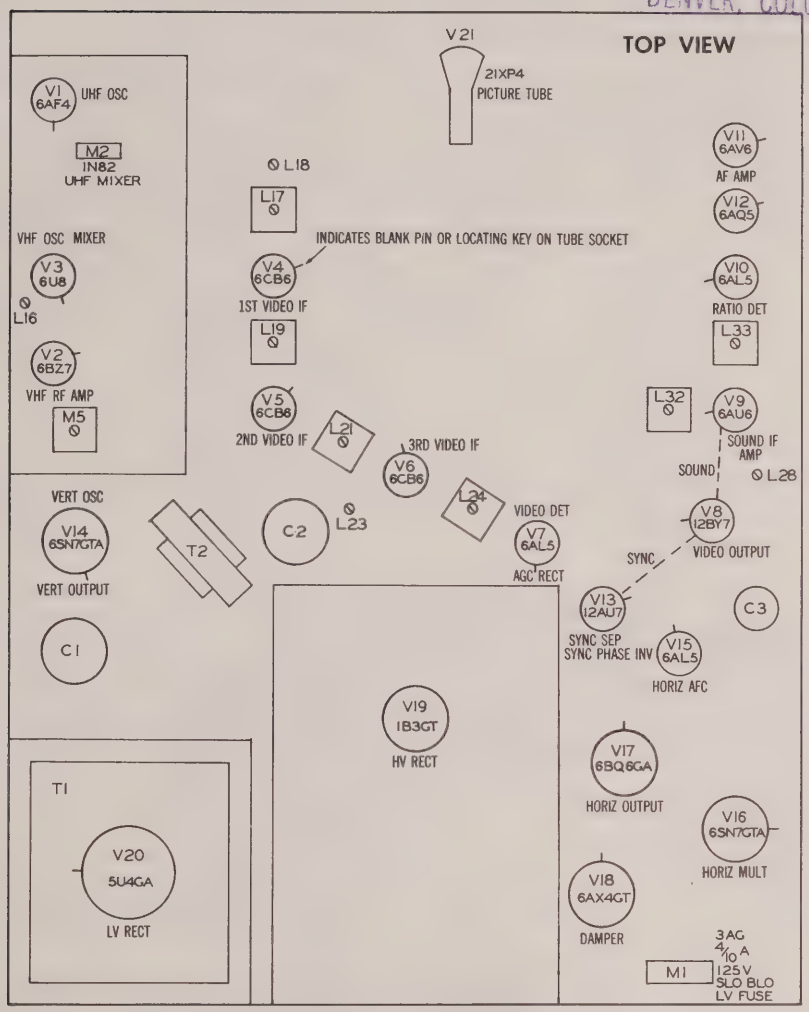
TUBE PLACEMENT CHART



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MODEL WG-5100A

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, V7, V8 (V1 UHF only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V8, V21
Has pic, no sound - V9, V10, V11, V12

SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V13, V15, V16
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V21
No vertical deflection - V14
Poor vert. linearity or foldover - V14
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20
Vert. off freq. - V13, V14
Horiz. off freq. - V13, V15, V16

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS - READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C32A. Positive lead to chassis.
Remove the RF amplifier tube (V2) from its socket.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to tuner chassis.	44MC (10MC Swp)	41.25MC 45.75MC 47.25MC	Any unused channel	Vert. Amp. thru detector (Fig.1) to pin 5 (plate) of 6CB6 (V4). Low side to chassis.	A1, A2, A3, A4	Adjust to place 47.25MC marker in trap notch as in Fig. 2. Adjust A2, A3 and A4 for response similar to Fig. 2. A2 and A3 affects flat portion of curve. A4 positions the 41.25MC marker. Make sure 45.75MC marker is on peak as shown or 44.5MC marker on overall response will be incorrect.
2.	"	"	Not used	42.5MC (Unmod)	"	Use VTVM. DC probe to point (A). Common to chassis.	A5	Increase bias from 1.5 volts to 4.5 volts at ungrounded side of C32A. Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	"	45.3MC	"	"	A6	"
4.	"	"	"	43.9MC	"	"	A7	"
5.	"	"	"	41.25MC	"	"	A8	Adjust for MINIMUM deflection.
6.	"	"	44MC (10MC Swp)	41.25MC 42.25MC 42.5MC 43.9MC 44.5MC 45.3MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.3. SLIGHTLY retouch A5 thru A8 to obtain desired response. If A1 thru A8 requires retouching step 1 should be repeated.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V7) Low side to chassis.	Not used	4.5MC (400%Mod)	Any unused channel	Vert. Amp. to pin 11 (cathode) of picture tube. Low side to chassis.	A9	Adjust for MINIMUM 400% indication on scope.

ALTERNATE 4.5MC TRAP ALIGNMENT

Replace the RF amplifier tube (V2) and remove bias battery. Tune in a TV station and adjust A9 for MINIMUM 4.5MC beat interference in picture.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove 6CB6 (3rd. IF tube (V6)) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V7). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A10, A11	Adjust for maximum deflection. Use only enough generator output to provide usable indication on VTVM.
9.	"	"	"	"	DC probe to point (C). Common to chassis.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V6 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove 6CB6 (3rd. IF Tube (V6)) from its socket.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V7). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A10, A11	Disconnect stabilizer capacitor (C4). Use only enough sweep generator output to provide usable indication on scope. Adjust for curve of maximum amplitude and straightness of crossover lines. Replace V6 in its socket.
9.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A12	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A-11 for maximum amplitude and straightness of crossover lines. Replace V6 in its socket.

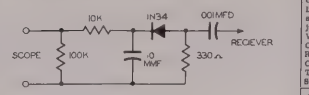


FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

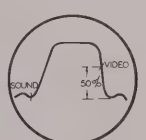


FIG. 6

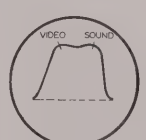


FIG. 7

OSCILLATOR ALIGNMENT (VHF PORTION)

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A13 adjustment. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel.
If adjustment of A13 will not bring all channels well within range of the fine tuning control it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency. The channel oscillator adjustment screws are reached thru a hole just above the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is tuned to each VHF channel. This hole extends thru the UHF tuner.
Connect the negative lead of a 4.5 volt battery to the ungrounded side of C32A. Positive lead to chassis.
Replace RF amplifier (V2) in its socket.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (60MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should be at 50%.
			207MC (60MC Swp)	205.25MC 209.75MC	12		A15	
			201MC (60MC Swp)	199.25MC 203.75MC	11		A16	
			195MC (60MC Swp)	193.25MC 197.75MC	10		A17	
			189MC (60MC Swp)	187.25MC 191.75MC	9		A18	
			183MC (60MC Swp)	181.25MC 185.75MC	8		A19	
			177MC (60MC Swp)	175.25MC 179.75MC	7		A20	
			85MC (60MC Swp)	83.25MC 87.75MC	6		A21	
			79MC (60MC Swp)	77.25MC 81.75MC	5		A22	
			69MC (60MC Swp)	67.25MC 71.75MC	4		A23	
			63MC (60MC Swp)	61.25MC 65.75MC	3		A24	
			57MC (60MC Swp)	55.25MC 59.75MC	2		A25	

RF AND MIXER ALIGNMENT (VHF PORTION)

Connect the negative lead of a 3 volt battery to the ungrounded side of C32A. Connect positive lead to chassis.
Connect the synchronized sweep voltages from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistor	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A26, A27, A28	Adjust for response similar to Fig. 7 with markers above 90%.
12.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel make compromise adjustment of A26, A27 and A28 with channel switch set to that channel. Then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

IF WAVE TRAP ADJUSTMENT

The IF wave trap should be tuned to minimize interference caused by signals which fall within the video IF bandpass (40-48MC). Tune in a station on which the interference is noted and adjust A29 for minimum interference in the picture.

UHF OSCILLATOR ALIGNMENT

Adjust the UHF oscillator screws only when unable to tune the point of best picture and sound with the fine tuning control. If necessary to adjust oscillator screws, switch tuner to UHF position and remove tuner knobe.
Connect bias battery as under "VHF Oscillator Alignment".
The UHF channel oscillator adjustment screws are reached thru the same hole used for VHF oscillator adjustment. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13	Two 120Ω Carbon Resistors	Across UHF terminals with 120Ω in each lead.	473MC (10MC Swp)	471.25MC 475.75MC	14	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A30	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should be at 50%.
			515MC (10MC Swp)	513.25MC 517.75MC	21		A31	
			575MC (10MC Swp)	573.25MC 577.75MC	31		A32	
			625MC (10MC Swp)	623.25MC 627.25MC	41		A33	
			695MC (10MC Swp)	693.25MC 697.75MC	51		A34	
			755MC (10MC Swp)	753.25MC 757.75MC	61		A35	
			815MC (10MC Swp)	813.25MC 817.75MC	71		A36	
			875MC (10MC Swp)	873.25MC 877.75MC	81		A37	

UHF RF AND MIXER ALIGNMENT

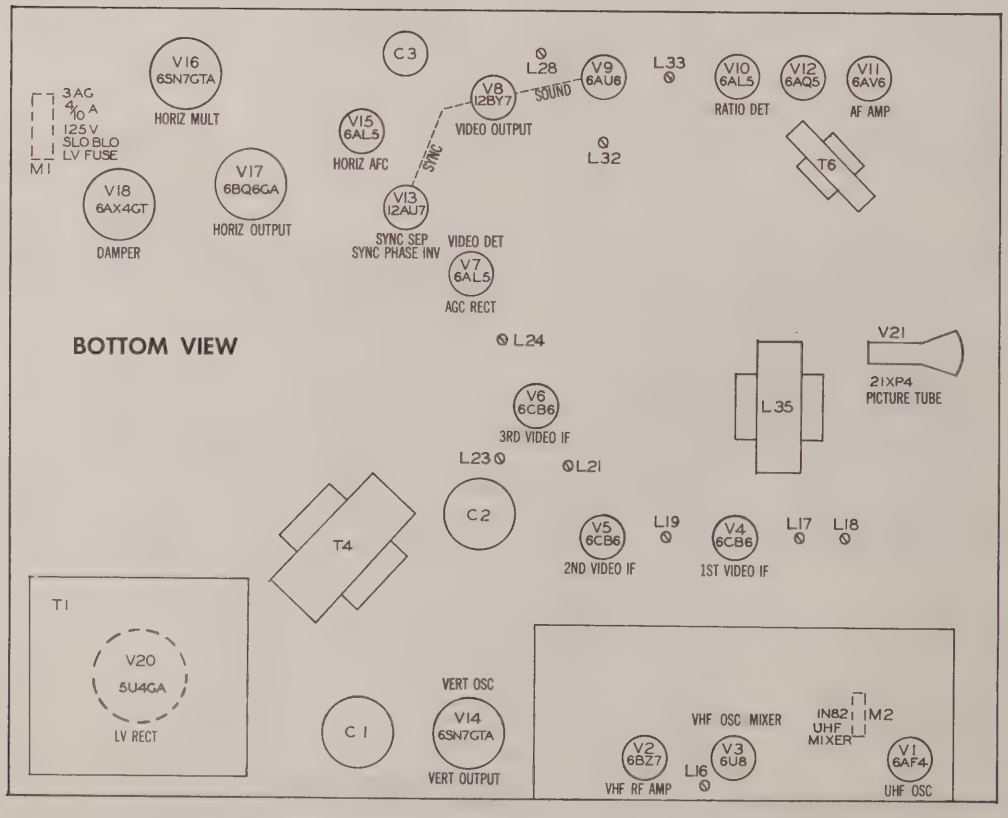
The UHF RF and Mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

AIRLINE
MODEL WG-5100A

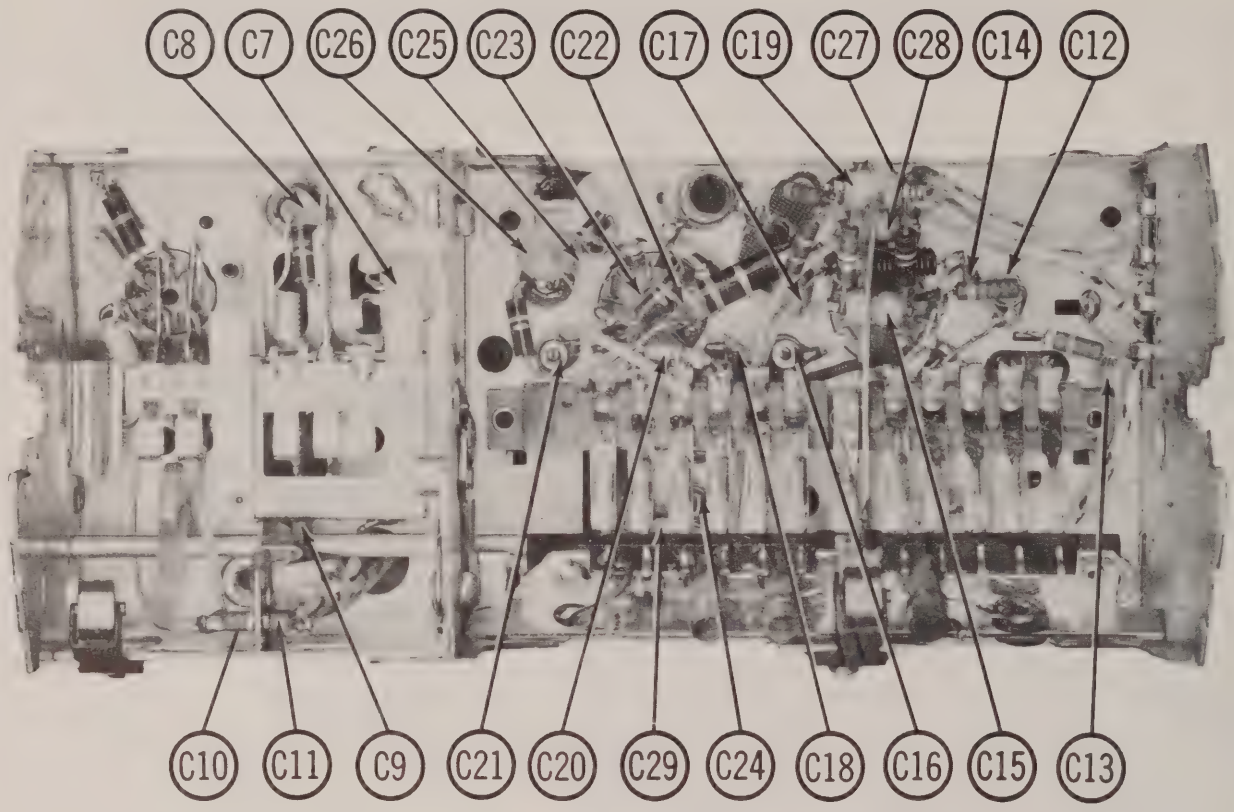
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	†■6. 5KΩ	10KΩ	. 1Ω	0Ω	0Ω	10KΩ	†■6. 5KΩ		
V 2	6BZ7	†700Ω	†100KΩ	INF	0Ω	. 1Ω	INF	1. 5Meg	0Ω	†700Ω
V 3	6U8	†5. 8KΩ	200KΩ	†100KΩ	. 1Ω	0Ω	†8. 2KΩ	0Ω	0Ω	10KΩ
V 4	6CB6	1. 5Meg	47Ω	0Ω	. 1Ω	†4. 6KΩ	†4. 6KΩ	0Ω		
V 5	6CB6	1. 5Meg	47Ω	0Ω	. 1Ω	†4. 6KΩ	†4. 6KΩ	0Ω		
V 6	6CB6	. 2Ω	180Ω	0Ω	. 1Ω	†3KΩ	†3KΩ	0Ω		
V 7	6AL5	900Ω	3. 3KΩ	. 1Ω	0Ω	. 4Ω	0Ω	1Meg		
V 8	12BY7	250Ω	1Meg	0Ω	. 1Ω	. 1Ω	0Ω	†4KΩ	†2. 5KΩ	0Ω
V 9	6AU6	56KΩ	0Ω	. 1Ω	0Ω	†3. 5KΩ	†25KΩ	0Ω		
V 10	6AL5	INF	INF	. 1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 11	6AV6	10Meg	0Ω	. 1Ω	0Ω	NC	NC	†500KΩ		
V 12	6AQ5	500KΩ	330Ω	0Ω	. 1Ω	†1. 4KΩ	†1KΩ	500KΩ		
V 13	12AU7	†200KΩ	1. 5Meg	0Ω	0Ω	0Ω	†6. 2KΩ	45KΩ	2. 2KΩ	. 1Ω
V 14	6SN7GTA	2. 2Meg	▲2. 2Meg	190Ω	2. 2Meg	▲4KΩ	2KΩ	0Ω	. 1Ω	
V 15	6AL5	4. 8Meg	4. 8Meg	. 1Ω	0Ω	10KΩ	NC	10KΩ		
V 16	6SN7GTA	5. 2Meg	†4. 3KΩ	1. 5KΩ	220KΩ	†250KΩ	1. 5KΩ	. 1Ω	0Ω	
V 17	6BQ6GA	NC	0Ω	TP	†15KΩ	470KΩ	TP	. 1Ω	100Ω	Top Cap ▲18Ω
V 18	6AX4GT	TP	NC	100KΩ	TP	†40Ω	TP	. 1Ω	0Ω	
V 19	1B3GT	PINS 1 - 8 HAVE INFINITE RESISTANCE								Top Cap ▲340Ω
V 20	5U4GA	INF	20KΩ	INF	27Ω	INF	25Ω	INF	20KΩ	
V 21	21YP4	0Ω	8. 2KΩ	Pin 6 †100KΩ	Pin 10 ▲3. 3KΩ	Pin 11 †470KΩ	Pin 12 . 1Ω			

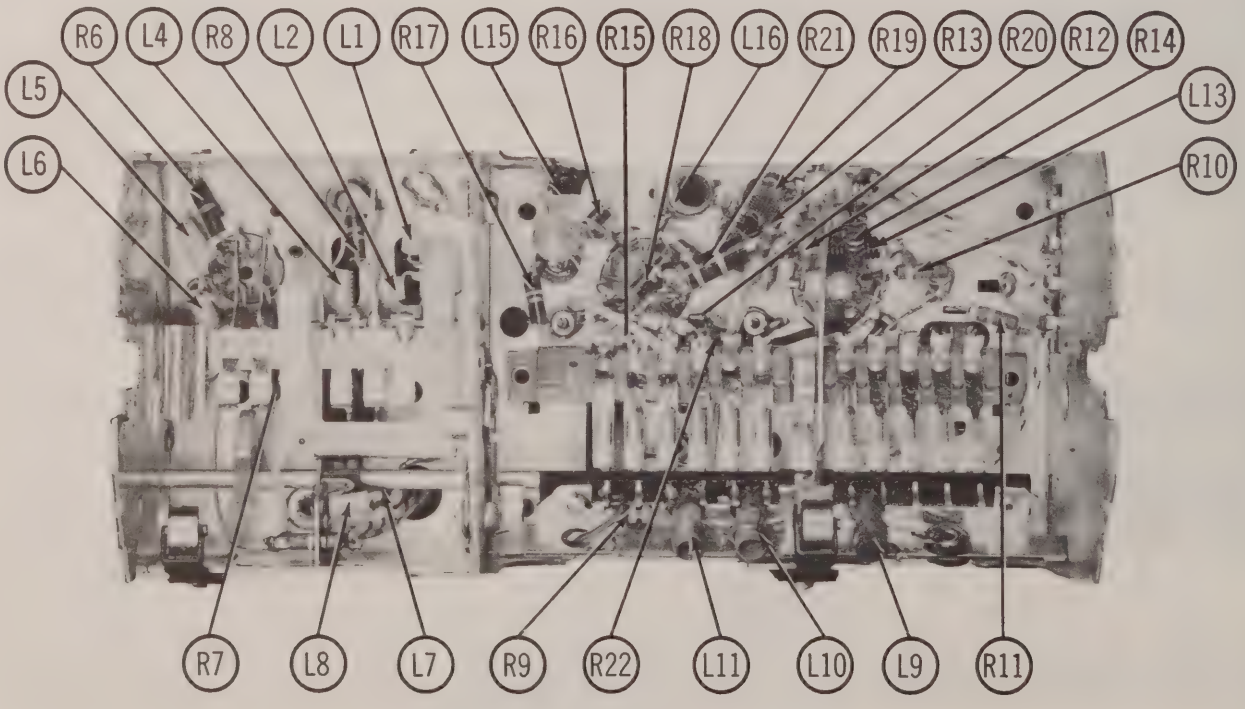
† MEASURED FROM PIN 2 OF V20.
■ MEASURED IN "UHF" POSITION.
▲ MEASURED FROM PIN 3 OF V18.
NC - NO CONNECTION
TP - TIE POINT
ALL MEASUREMENTS TAKEN IN "VHF" POSITION UNLESS OTHERWISE DESIGNATED.



TUBE PLACEMENT CHART

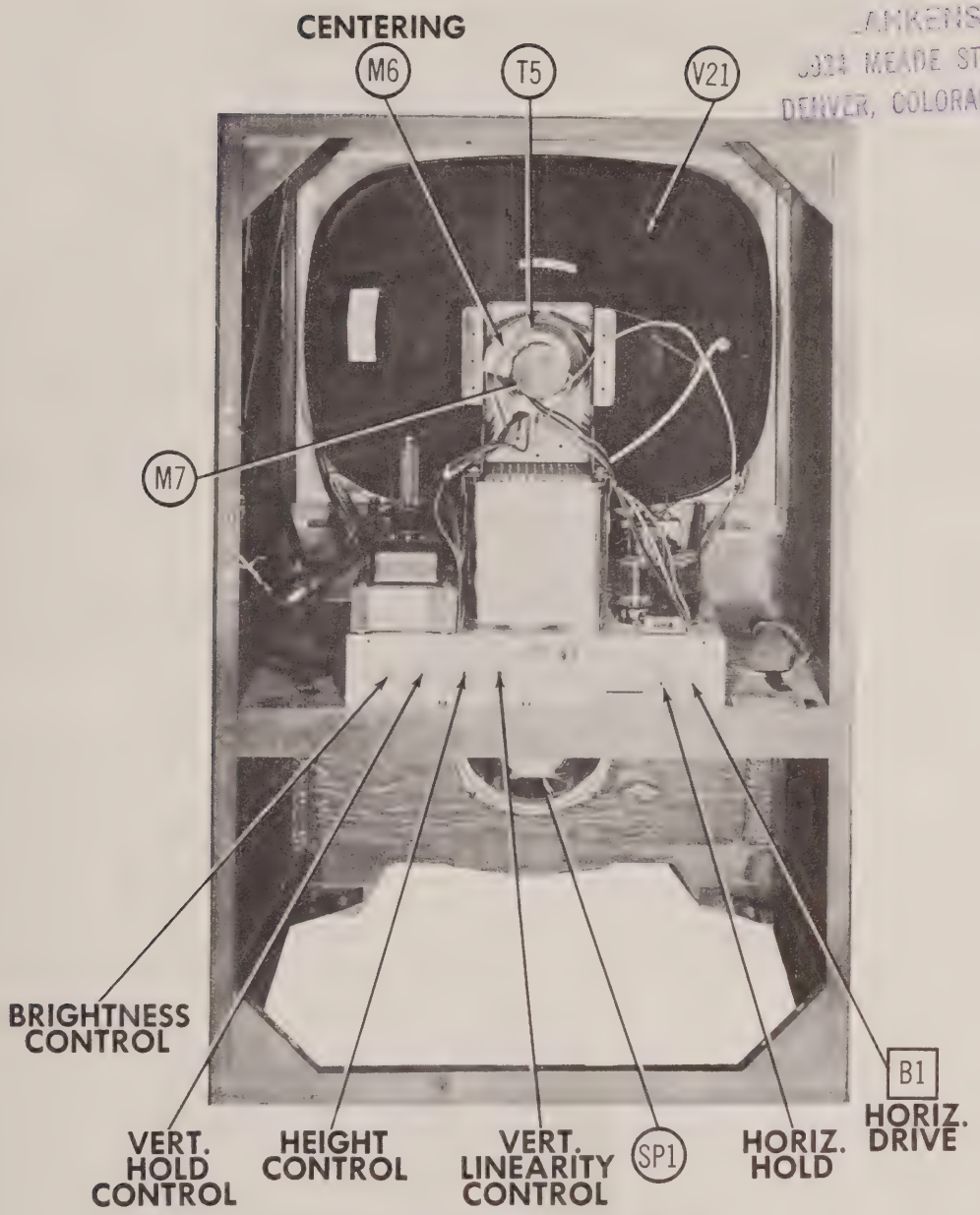


UHF-VHF TUNER BOTTOM VIEW-CAPACITOR IDENTIFICATION



UHF-VHF TUNER BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

...ITY OF
...ANKENSHIP.
...324 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station preferably a test pattern. Adjust the horizontal hold (L34) until the picture synchronizes horizontally. Switch off channel and back again, picture should now be locked in sync, if not slightly readjust L34.

Turn contrast control maximum counter clockwise and brightness control for maximum brightness. Turn the horizontal drive trimmer (B1) clockwise until white bars or compression near the center of the raster appear. Then turn B1 counter clockwise until the white bars or compression disappear.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss Of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V17, V18 and V20. Check adjustment B1. Check R92, R93, R89, C79, C77, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V17 and V18. Check adjustment B1. Check R93, R92, C6, C79, T3, T5A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V17 and V18. Check horizontal output and damper stage stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V16, V17 and V18. Check C75 for open. Check L34, C76, C74, R84 and other associated components.

XMAS TREE EFFECT

Check by substitution V16, V17 and V18. Check T3 and T5 for internal arcing. Check L34, C76, C73, C77, R84, R88, R82 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V14. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R94, R75 and other associated components	Check T2, R71, R4, R69, C67, C70 and other associated components.

INSUFFICIENT SWEEP

Substitute V14. Check height and vertical linearity controls for proper operation. Check R71, T4 and other associated components.

COMPRESSED AT BOTTOM

Substitute V14. Check R4, R71, T2, C70, and other associated components.

COMPRESSED AT TOP

Substitute V14. Check R75, R5, C2B, C70, T4 and other associated components.

FOLDS

Substitute V14. Check C68, C69, R76, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V13. Check C62, C63, C64, R60, R65, R64, R66 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V14. Check vertical integrator network. Check R69, R3, C66, C67, T2 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check C71, C72, R78, R80, L34 and other associated components.

HORIZONTAL BENDING

Check by substitution V13, V15 and V16. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V8. Check C49, C51, R41, R42, R40 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9. Check video IF alignment.

POOR CONTRAST

Substitute V8. Check C49, C51, L29, L26, L27, R40 and other associated components.

NEGATIVE PICTURE

Substitute V8. Check picture tube. Check C49, C51, R40, R41, R42 and other associated components.

SMEAR

Substitute V8. Check L26, L27, L29, L30, L31, C49, C51 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V2, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10, V11 and V12. Check stages V11 and V12 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C58, C59, C60A, C61, C3A, C3B, R57, R55A, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A12 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak Or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V20 Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V20. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Osc.	6AF4	6AF4	7DK	
V2	VHF RF Amp.	6BZ7	6BZ7	9AJ	
V3	VHF Osc.-Mixer	6U8	6U8	9AE	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Det.-AGC Rejct.	6AL5	6AL5	6BT	
V8	Video Output	12BY7	12BY7	9BF	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Det.	6AL5	6AL5	6BT	
V11	AF Amp.	6AV6	6AV6	7BT	
V12	Audio Output	6AQ5	6AQ5	7BZ	
V13	Sync Separator-Sync Phase Inv.	12AU7	12AU7	9A	
V14	Vert. Osc.-Vert. Output	6SN7GTA	6SN7GTA	8BD	
V15	Horiz. AFC	6AL5	6AL5	6BT	
V16	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V17	Horiz. Output	6BQ6GA	6BQ6GA	6AM	
V18	Damper	6AX4GT	6AX4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4GA	5U4GA	5T	

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DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: AIRLINE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V21	21YP4	21YP4	21YP4	21YP4	21YP4	12L	① Aluminized
		21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ①	12L	
	21AVP4					12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	▲80	300	45X397			FP229.4	TM-D80-350	D-145	
B	▲60	300							
C2A	▲80	300	45X395			FP229.8	TM-3057	D-322	
B	▲100	50							
C3A	■20	300	45X410			FP230	TM-30-300 / TD-50-50	T-695	Note 1
B	▲40	50							
C4	5	25				TC30	TD-5-25	MMT-0505	
C5	30	400	45X393			TC77	TD-30-450	FM-4530	
C6	5	25				TC30	TD-5-25	MMT-0505	
C7A	1								
B	2								
C8	120			D6-121		UC-5312			
C9	10		13M-20A-100D-N-1						
C10	800		13M-23E801Z	MFT-1000					
C11	800		13M-23E801Z	MFT-1000					
C12	.5-3		31A-056-2	829-3	3115-01-0R5	CT565A			
C13	1500		13L-8XA152Z	DD-152	801-0015	DC-5215			
C14	3		13L-8C030H	TCZ-3	NP0A-030	ZT-5533			
C15	800		13M-23E801Z						
C16	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A			
C17	1.5		13L-831R5C	TCZ-1.5	NP0A-1R5	ZT-5515			
C18	47		13L-80470K	D6-470	831-470	UC-5447			
C19	800		13M-23E801Z						
C20	47		13M-20U470K						
C21	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A			
C22	10		13L-8U100F	TCN-10	N750K-100	NT-541			
C23	5		13L-8UA050C						
C24	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A			
C25	1500		13L-8XA152Z	DD-152	801-0015	DC-5215			
C26	220		13L-12D221K	D6-221	811-221	UC-5322			
C27	800		13M-23E801Z						
C28	800		13M-23E801Z						
C29	1500		13L-8XA152Z	DD-152	801-0015	DC-5215			
C30	36		47X626						
C31	47			D6-470	GP1K-470	UC-5447		K-1447	
C32A	1000		80X3	DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C33	680			D6-681	811-681	UC-5368		K-1368	
C34	1000			DD-102	801-001	DC-521		K-1210	
C35A	1000		80X3	DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C36	680			D6-681	811-681	UC-5368		K-1368	
C37	1.5		47X584	TCZ-1.5	NP0A-1R5	ZT-5515			
C38	150	500	RCM15E151K	TCZ-150	NP0-333-151	MCB236		KR-1315	
C39	470		80X4	D6-471	831-471	UC-5347		K-1347	Note 2
C40	470		80X4	D6-471	831-471	UC-5347		K-1347	
C41	1000			DD-102	801-001	DC-521		K-1210	
C42	1000			DD-102	801-001	DC-521		K-1210	
C43	15			D6-150	GP1K-150	UC-5415		K-1415	
C44	.22	200				PT4022	IMP2-P22	3302022	
C45	1000			DD-102	801-001	DC-521		K-1210	
C46	1000			DD-102	801-001	DC-521		K-1210	
C47	5		47X562	TCZ-5	NP0K-050	ZT-555		CR-1550	
C48	5		47X562	TCZ-5	NP0K-050	ZT-555		CR-1550	
C49	.047	200	RCP10M2473M	DF-503		PT4147	IMP2-S47	3302147	
C50	30		47X669						
C51	.1	400		DF-104		PT401	IMP4-P1	330401	
C52	1.5		47X584	TCZ-1.5	NP0A-1R5	ZT-5515			
C53	100			D6-101	GP1K-101	UC-531		K-1310	
C54	5000			DD-502	811-005	DC-525		C-1250	
C55	5000			DD-502	811-005	DC-525		C-1250	
C56	330	500	47X570					KR-1333	

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CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA AIRLINE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C57	470	500	47X525	D6-471	GP5K-471			K-1347	
C58	047	200	RCP10M3473M	DF-503		PT4147	IMP3-047	3302147	
C59	1000			DD-502	811-006	DC-525	IMP6-D5	C-1350	
C60A	10000								
B	250		†76X5	†PC-80	†1404-01				
C									
C61	.0047	600		D6-472	GP2-333-472	PT6347	IMP6-D47	3306247	
C62	330	500	47X570					KR-1333	
C63	.01	400		D6-103	GP3-333-103	PT4ll	IMP4-SI	330411	
C64	047	400		DF-503		PT4147	IMP4-S47	3304147	
C65A	2000					PT4122	IMP5-D3	C-1320	
B	5000		♦76X7	♦PC-100	♦1405-01	DC-525	IMP6-D5	C-1350	
C	5000					DC-525	IMP5-D5	C-1310	
C66	.01	400		D6-103	GP2-333-103	PT4ll	IMP4-SI	330411	
C67	022	200		DF-503	811-02	PT4122	IMP4-S22	3304122	
C68	047	500	RCP10M6473M	DF-503		PT6147	IMP6-S47	3306147	
C69	022	200		DF-203	811-03	PT4122	IMP4-S23	3304122	
C70	1	600		DF-104		PT601	IMP6-P1	330601	
C71	1000			DD-102	801-001	DC-521	IMP6-D1	K-1310	
C72	1000			DD-102	801-001	DC-521	IMP6-D1	K-1310	
C73	.01	400		D6-103	GP3-333-103	PT4ll	IMP4-SI	330411	
C74	0047	400	RCP10M4472M	D6-472	GP2-333-472	PT6347	IMP6-D47	3306247	
C75	.047	200		DF-503		PT4147	IMP3-S47	3302147	
C76	4700	500	47X543					CR-1347	
C77	430	500	RCM30B431K					KR-1343	
C78	047	400	RCP10M3473M	DF-503		PT4147	IMP4-S47	3304147	
C79	330	500	47X570					KR-1333	
C80	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C81	1	400		DF-104		PT601	IMP4-P1	330401	
C82	.15	400	RCP10M4154M			PT4015	IMP4-P15	3304015	
C83	10000			DD-103	811-01	DC-511	IMP6-SI	330611	
C84	10000			DD-103	811-01	DC-511	IMP6-SI	330611	

Note 1: In some versions C3A is 10 MFD.
Note 2: Model WG-5100B uses 680 MMF in this application.
† Items C80A, C80B, C80C, R55A and R55B are combined in one unit.
When replacing items separately C60B and C60C should total 250 MMF.
♦ Items C65A, C65B, C65C, R67A, R67B and R67C are combined in one unit.

CONTROLS

ITEM No.	RATING RESIST ANCE	RATING WATTS	REPLACEMENT DATA AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No	INSTALLATION NOTES
R1A	1000Ω	½	B76X51	*QJ-638	RTV-503	F1-4	UF13L	Contrast - Panel
B	1Meg					R2-59	UR16-T254	Volume tapped at 250KΩ - Rear
C	Switch					KB-2	UB-37	Attach to R1B
R2A	500KΩ	½	B40X385	QU-133	A47-500K-S	AB-59	SU-50	Brightness
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	1.5Meg	½	B40X386	QU-138	A47-1.5Meg-S	AB-743	U-155	Vert. Hold
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	2.5Meg	½	B40X388A	QU-139	A47-2.5Meg-S	AB-83	SU-505	Height
B	Shaft		Not Req.	RQ	FKS-1/4	AK-4	Not Req.	Attach to R4A
R5A	500KΩ	½	B40X378	QU-116	A47-10K-S	AB-14	SU-30	Vert. Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R5A

*CONCENTRIBIT EQUIVALENT: KIT K-4, BASE ELEMENTS & SHAFTS: B1J-108 & P6-218 (PANEL)
B1J-1378 & R18-313 (REAR)
76-2 SWITCH

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	IRC PART No.	NOTES
R6	10KΩ	½		BTS-10K	
R7	100Ω	½		BTS-100	
R8	100Ω	½		BTS-100	
R9	3300Ω	½		BTS-3300	
R10	22KΩ	½		BTS-22K	
R11	47KΩ	½		BTS-47K	
R12	270KΩ	½		BTS-270K	
R13	68Ω	½		BTS-680	
R14	180KΩ	½		BTS-180K	
R15	680KΩ	½		BTS-680K	
R16	100KΩ	½		BTS-100K	
R17	100KΩ	½		BTS-100K	
R18	100KΩ	½		BTS-100K	
R19	8200Ω	½		BTS-8200	
R20	10KΩ	½		BTS-10K	
R21	3300Ω	1		BTA-3300	
R22	33KΩ	½		BTS-33K	
R23	33000Ω 5%	½		BTS-3300 5%	
R24	1000Ω	½		BTS-1000	
R25	470.5%	½		BTS-47 5%	
R26	470Ω	½		BTS-470	
R27	150Ω	½		BTS-150	
R28	39K5 5%	½		BTS-39K 5%	
R29	47Ω 5%	½		BTS-47 5%	
R30	470Ω	½		BTS-470	
R31	4000Ω	1	43X388	1.3/4A-4000	
R32	39KΩ	½		BTS-39K	
R33	180Ω	½		BTS-180	Note 1
R34	470Ω	½		BTS-470	
R35	470KΩ	½		BTS-470K	
R36	1Meg	½		BTS-1Meg	
R37	47KΩ	½		BTS-47K	
R38	3300Ω	½		BTS-3300	
R39	1Meg	½		BTS-1Meg	
R40	47Ω	½		BTS-47	
R41	2000Ω 5%	2	D82202	BTB-2000 5%	
R42	2000Ω 5%	2	D82202	BTB-2000 5%	
R43	10KΩ	½		BTS-10K	
R44	470KΩ	½		BTS-470K	
R45	100KΩ	½		BTS-100K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	IRC PART No.	NOTES
R46	56KΩ	½		BTS-56K	
R47	33KΩ	½		BTS-33K	
R48	33KΩ	½		BTS-33K	Note 5
R49	1000Ω	½		BTS-1000	
R50	270Ω	½		BTS-270	
R51	150KΩ	½		BTS-150K	
R52	10KΩ 5%	½		BTS-10K 5%	
R53	10KΩ 5%	½		BTS-10K 5%	
R54	10Meg	½		BTS-10Meg	
R55A	500KΩ	½	†76X5	BTS-470K	
B	500KΩ	½		BTS-470K	
R56	330Ω	2		BTA-330	
R57	1000Ω	2		BTB-1000	
R58	150KΩ 5%	½		BTS-150K 5%	
R59	1.5Meg	½		BTS-1.5Meg	
R60	820KΩ	½		BTS-820K	
R61	270KΩ	½		BTS-270K	
R62	1Meg	½		BTS-1Meg	
R63	47KΩ	½		BTS-47K	
R64	2200Ω 5%	½		BTS-2200 5%	
R65	1500Ω	½		BTS-1500	Note 2
R66	2200Ω 5%	½		BTS-2200 5%	
R67A	22KΩ			BTS-22K	
B	8200Ω		♦76X7	BTS-8200	
C	820Ω			BTS-820	
R68	33KΩ	½		BTS-33K	
R69	1.5Meg	½		BTS-1.5Meg	Note 3
R70	22KΩ	½		BTS-22K	
R71	1.5Meg	½		BTS-1.5Meg	
R72	2.2Meg	½		BTS-2.2Meg	
R73	120KΩ	½		BTS-120K	Note 4
R74	3.3Meg	½		BTS-3.3Meg	
R75	82Ω	½		BTS-820	
R76	8200Ω	½		BTS-8200	
R77	560Ω	½		BTS-560	
R78	100KΩ	½		BTS-100K	
R79	4.7Meg	½		BTS-4.7Meg	
R80	100KΩ	½		BTS-100K	
R81	27KΩ	½		BTS-27K	
R82	18KΩ	½		BTS-18K	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No	IRC PART No.	NOTES
R83	470KΩ	½		BTS-470K	
R84	1500Ω 5%	½		BTS-1500 5%	
R85	4300Ω 5%	½	C83432	BTA-4300 5%	
R86	220KΩ	½		BTS-220K	
R87	220KΩ	½		BTS-220K	
R88	47KΩ	½		BTS-47K	
R89	8200Ω	½		BTS-8200	
R90	470KΩ	½		BTS-470K	
R91	68Ω	½		BTS-68	

† Items R55A, R55B, C60A, C60B and C60C are combined in one unit.
♦ Items R67A, R67B, R67C, C65A, C65B and C65C are combined in one unit.
Note 1: Some versions may use a 1500Ω resistor in this application.
Note 2: Some versions may use a 3300Ω resistor in this application.
Note 3: Some versions may use a 1.3Meg resistor in this application.
Note 4: Some versions may use a 220KΩ resistor in this application.
Note 5: Model WG-5100B uses a 100KΩ resistor in this application.
Note 6: Model WG-5100B uses a 820Ω resistor in this application.

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	IRC PART No.	NOTES
R92	1000	2			
R93	15KΩ	2		BTB 15K	Note 6
R94	3300Ω	1		BTA-3300	
R95	47KΩ	1		BTA-47K	
R96	5600Ω	1		BTS 5600	
R97	2.2Ω	1	43X322		
R98	2500Ω	10			
R99	100KΩ	2		BTB 100K	
R100	270KΩ	2		BTB-270K	

TRANSFORMER (POWER)

ITEM No	RATING PRI	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA AIRLINE PART No.	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Halldorson PART No	Thordarson PART No
T1	117VAC ± 1.5A	516VCT .240ADC	5VAC & 3A	53X340A						
	SEC 3	SEC 4	SEC 5							
	6.3VAC @ 3.3A									

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA AIRLINE PART No.	Halldorson PART No.	Merit PART No	RCA PART No	Rem PART No	Stancor TYPE No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans.	54X10	B47G3	A-3303	32Q71 ①	Y405	A-8125	26A03	A-97X
T3	Horiz. Output Trans.	53X343 53X347④	P8411④*	HV0-9①*	33Z71①*	X110*	A-8253①*	FLY-37*	D-35①*
T4	Vert. Output Trans.	52X160	Z1806①	A-3039①	32S71①	V312①	A-8141①	26B54①	A-104X①
T5A	Yoke-Horiz. (53MB)	9A3334-③④	DF-603②③④	MDF-73②	31D03②③	Y70F14②③	DY-8A②③	Y-4②③	Y-17②③
B	Vert. (49MB)	2A435 ⑤		④		④			

① Drill new mounting hole(s).
② Use original yoke cover and centering device.
③ Use original yoke damping network.
④ Includes resistor R7T.
⑤ Yoke cover and centering device.
Horiz. output trans. for model WG-5100B.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	AIRLINE PART No	Stancor PART No	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T6	4.75KΩ	3.7Ω	51X107 51X161 ①	A-3877	A-2930	S-8X	Z1107	24S51	① Alternate output trans.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP	REPLACEMENT DATA AIRLINE PART No.	JENSEN PART No	QUAM PART No.	NOTES
SP1	8"	PM	3.7Ω	12A522	ST-115 Mod. P8-V	8A12	

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rem Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	6	9	9	10	13	9	13	10
	5	8	8	8	11	8	11	8
	4	6 See Note ②	6 See Note ②	6 See Note ②	6	6 See Note ②	6	6 See Note ②
	3	7	7	7	5	7	5	7
	1	1	1	3	1	1	1	3
	A	RF800 Term #2	MWC-1 Orange Term	1	8	Black Term	9	1
	G	RF800 Term #4	MWC-1 Black Term	2	8	WC-5 Orange Term	9	2
	Connect Width Coil Across	RF800 Term. #1 & #2 across 3 & 1	MWC-1 Term. Blue & Red across 3 & 1			WC-5 Term. Red & Blue across 2 & 1		
	Special Note ③	7 8	7 8	7		7 8		7 8

① Connect a 47 or 56MMF capacitor from open end of R96 (original terminal #3 connection) to terminal #3 of yoke.
② If the picture is out of phase, reverse width coil primary or secondary.
③ Jumper terminals #8 and "7".

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA AIRLINE PART No.	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	UHF Ant. Coil	ΩΩ		31K-137-04				
L2	UHF Ant. Coil	ΩΩ		31K-137-06				
L3A	UHF Ant, Mixer & Osc. Coils	ΩΩ		9A3331-10				Channels 10 thru 19
B	UHF Ant., Mixer & Osc. Coils	ΩΩ		9A3331-20				Channels 20 thru 29
C	UHF Ant., Mixer & Osc. Coils	ΩΩ		9A3331-30				Channels 30 thru 39
D	UHF Ant., Mixer & Osc. Coils	ΩΩ		9A3331-40				Channels 40 thru 49
E	UHF Ant., Mixer & Osc. Coils	ΩΩ		9A3331-50				Channels 50 thru 59
F	UHF Ant., Mixer & Osc. Coils	ΩΩ		9A3331-60				Channels 60 thru 69
G	UHF Ant., Mixer & Osc. Coils	ΩΩ		9A3331-70				Channels 70 thru 79
H	UHF Ant., Mixer & Osc. Coils	ΩΩ		9A3331-80				Channels 80 thru 83
L4	RF Choke	ΩΩ						
L5	Cathode Choke	ΩΩ		31K-137-02				
L6	Fil. Choke	ΩΩ		31K-137-07				
L7	UHF IF Coupling	ΩΩ						
L8	RF Choke	ΩΩ						
L9	UHF Inter-mediate Coil	ΩΩ	.2Ω	31K-213				Part of complete ass'y.
L10	UHF Inter-mediate Coil	.2Ω		31K-213				Part of complete ass'y.
L11	UHF Inter-mediate Coil	ΩΩ	.2Ω	31K-213				Part of complete ass'y.
L12A	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-2				Channe. 2
B	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-3				Channel 3
C	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-4				Channel 4
D	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-5				Channel 5
E	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-6				Channel 6
F	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-7				Channel 7
G	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-8				Channel 8
H	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-9				Channel 9
I	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-10				Channel 10
J	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-11				Channel 11
K	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-12				Channel 12
L	VHF Ant. Coil	ΩΩCT	ΩΩ	9A2329-13				Channel 13
L13	Beam Coil	ΩΩ						
L14A	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-2				Channel 2
B	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-3				Channel 3
C	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-4				Channel 4
D	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-5				Channel 5
E	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-6				Channel 6
F	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-7				Channel 7
G	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-8				Channel 8
H	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-9				Channel 9
I	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-10				Channel 10
J	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-11				Channel 11
K	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-12				Channel 12
L	VHF RF, Mixer Grid & Osc. Coils	ΩΩ		9A2330-13				Channel 13
L15	Fil. Choke	ΩΩ		34A-575				
L16	Conv. Plate	.1Ω		31K-264				
L17	1st Video IF	.1Ω		9A2316				
L18	IF Trap	.1Ω		9A2320				
L19	2nd Video IF	.2Ω	.2Ω	9A2317	17-5053	TV-127*	6226	Includes 47.25MC Trap
L20	Fil. Choke	ΩΩ		9A2323	19-3001	TV-189	4602	1 Microhenry
L21	3rd Video IF	.2Ω	.2Ω	9A2318		TV-138*	6233*	
L22	Parasitic Suppressor	ΩΩ		9A2322				Wound on 10Ω resistor
L23	41.25MC Cathode Trap	ΩΩ	ΩΩ	9A2321	20-1045*	TV-135	6234	
L24	4th Video IF	.4Ω	.4Ω	9A2319	17-5004			
L25	Fil. Choke	ΩΩ		9A2323	19-3001	TV-189	4602	1 Microhenry
L26	Series Peaking Coil	7.5Ω		36A30	19-3075		6173	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L27	Series Peaking Coil	9.5Ω		36A1	19-3100	TV-181	6177	100 Microhenries
L28	4.5MC Trap	3Ω		9A2336	20-1004	TV-151	1469	
L29	Series Peaking Coil	18Ω		36A28	19-3300■	TV-190■	6155■	350 Microhenries; Wound on 6.8KΩ resistor
L30	Shunt Peaking Coil	14Ω		36A29	19-4201▲	TV-184▲	6154▲	190 Microhenries; Wound on 2.7KΩ resistor
L31	Series Peaking Coil	9.5Ω		36A1	19-3100	TV-181	6177	100 Microhenries
L32	Sound IF	2.1Ω		9A2201			1470A	
L33	Ratio Det.	3.8Ω	.6ΩCT	9A2295	17-1033	TV-110	1468	Tertiary winding = .4Ω
L34	Horiz. Osc.	63Ω		9A2273	19-1576	TV-163	6210	

* Detune trap winding.
■ Parallel with 6.8KΩ resistor.
▲ Parallel with 2.7KΩ resistor.
♦ Remove 22KΩ resistor and retune.
† Detune trap.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L35	.240A	40.6Ω	.83HY	52X95	C-2326①	C-2996 ①	C-23X ①	C5037 ①	26C44

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AIRLINE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	4/10A 125V	16X147-3	16X146	313.400 (3AG-S/B-4/10A)	357001	MDL 4/10	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		AIRLINE PART No.	SYLVANIA PART No.		
M2	1N82		1N82 or 1N82A		UHF Mixer

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M3	Dial Light		#51, Bayonet
M4A	Tuner	25A1124	VHF-UHF - Model WG-5100A
B	Tuner	25A1128	VHF-UHF - Model WG-5100B
M5A	Trap	31K-225	VHF Ant. Input Filter - Model WG-5100A
B	Trap	31K-225-03	VHF Ant. Input Filter - Model WG-5100B
M6	Centering Device	2A435	Includes Yoke Cover
M7	Ion Trap	2A421	
B1	Trimmer Cap.	17A269	Horiz. Drive (120-400MMF)
	Knob	10A851-1	UHF Channel Sel. - Model WG-5100A
	Knob	10A849-1	VHF Channel Sel. - Model WG-5100A
	Knob	10A831-1	Contrast - Model WG-5100A
	Knob	10A830-1	On-Off-Volume - Model WG-5100A
	Knob	10A853-1	UHF Channel Sel. - Model WG-5100B
	Knob	10A852-1	VHF Channel Sel. - Model WG-5100B
	Knob	10A847-1	Contrast - Model WG-5100B
	Knob	10A830-1	On-Off-Volume - Model WG-5100B
	Knob	10A846-1	Fine Tuning - Model WG-5100B
	Safety Glass	17X181	Model WG-5100A
	Safety Glass	17X188	Model WG-5100B
	Mask	4X1230-1	Model WG-5100A
	Mask	4X1241-3	Model WG-5100B

TROUBLE SHOOTING AIDS (cont)

3024 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C81, C82, C80, C6 R93, R92 and other associated components.	Check L34, C76, C77, R85, R88, and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18 and V20. Check T3, T5A, R93, R88, C6, C77 and other associated components.

BLOOMING

Check by substitution V17, V18, V19 and V20. Check C79, C82, C6, R93 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss Of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak Or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V2, V3, V4, V5, V6, V7 and V8. Check video IF components for failure or change of value. Raster, No Sound, No Picture UHF, substitute V1.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

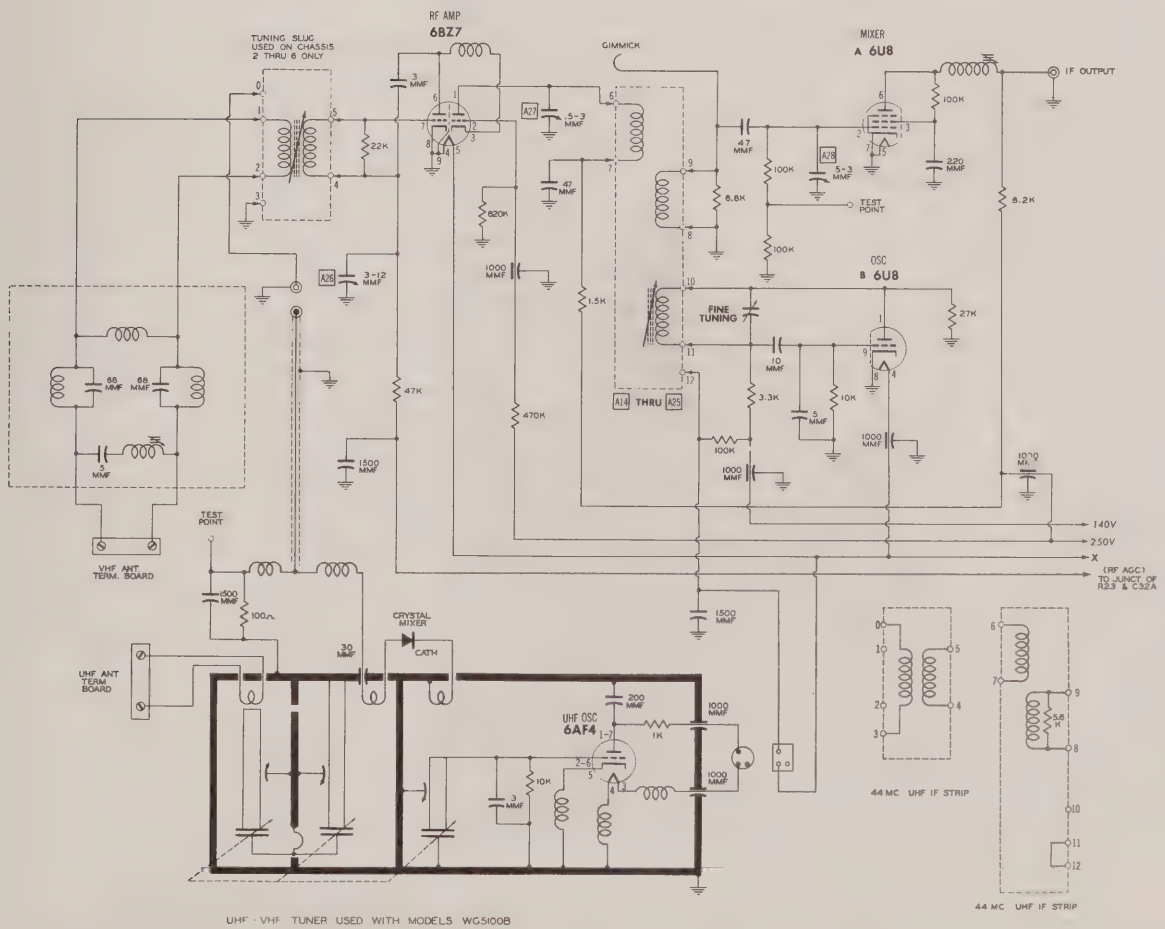
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



UHF - VHF TUNER USED WITH MODELS WG-5100B

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ALTERNATE TUNER SCHEMATIC

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF tuner oscillator circuit may be accomplished as follows:

1. Set the selector knob to VHF position.
2. Tune in a TV station and set the fine tuning control to the center of its range.
3. Remove the channel selector and fine tuning knobs.
4. Adjustments are accessible one at a time thru the small hole above and slightly to the left of the channel switch shaft.

To adjust the UHF oscillator, set the channel selector knobs to the desired UHF channel. The fine tuning knob should be at the center of its range. Remove knobs and adjust the oscillator slug thru the same hole as for VHF adjustments.

If two UHF channels are received and use the same UHF coil strips, the oscillator should be set for the channel closest to the center of the group.

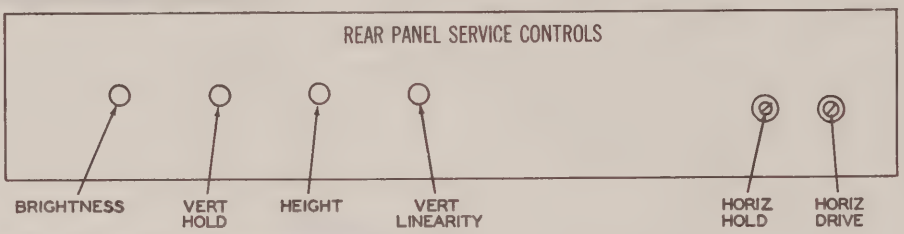
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 5 wood screws holding plastic strip at the top of safety glass. Remove plastic strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator (L34) can be made from rear panel of the chassis. L34 is used as the horizontal hold control. Adjust L34 until picture synchronizes horizontally, check by switching off channel and back again.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L33) located on top of the chassis. (For location see tube placement chart).

FUSES

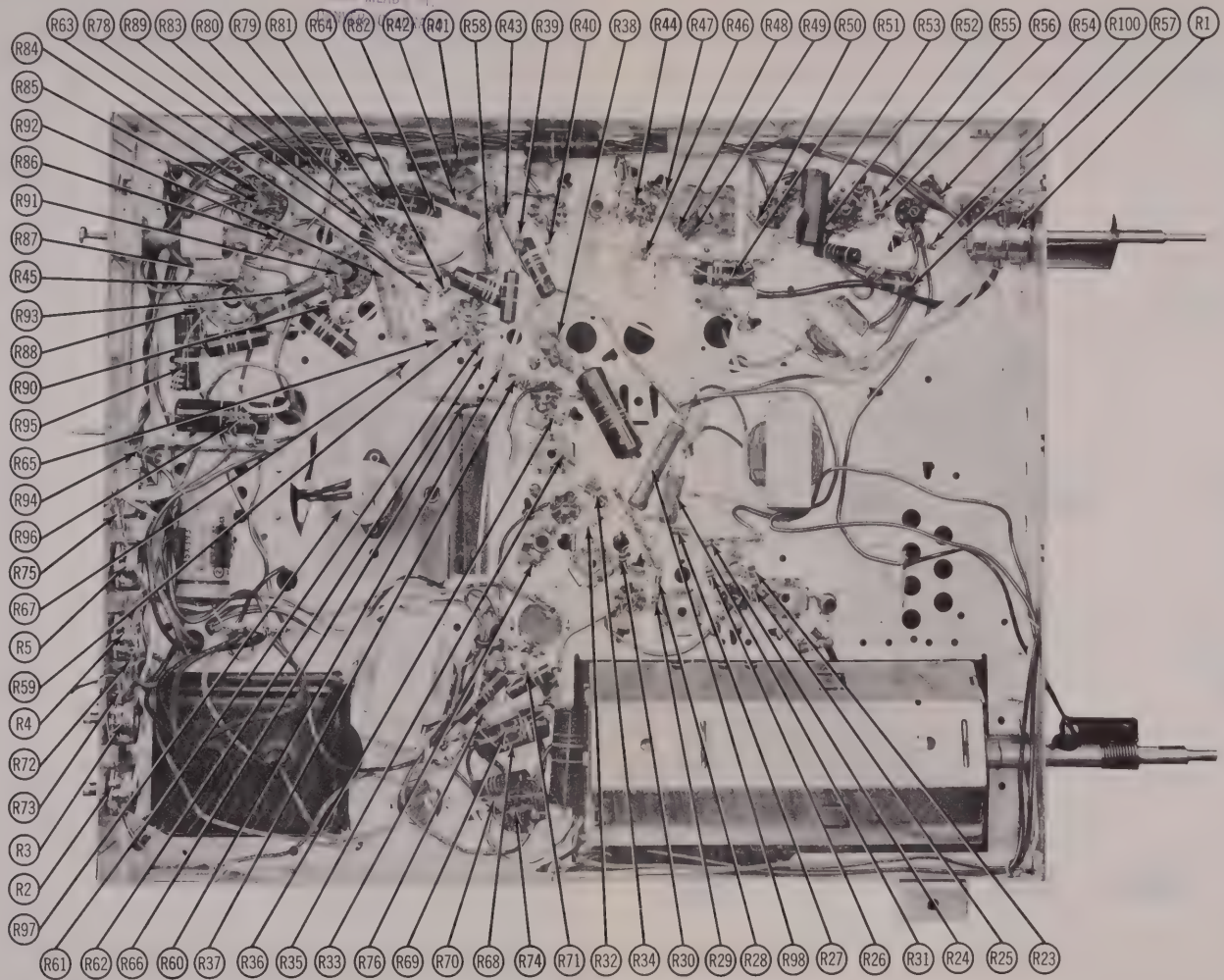
One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs and 1 fine tuning lever from front panel of cabinet.
2. Remove 4 wood screws. Remove rear cover.
3. Disconnect speaker leads, Remove 4 wood screws. Remove antenna bracket.
4. Remove 5 chassis bolts. Remove chassis.
5. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PHOTOFACT* Folder

*TRADE MARK

MAJESTIC MODELS 21C36, 21C37, 21C38, 21C39, 21D56, 21D57, 21D58, 21D59, 21T22, 21T23 (Series 116)

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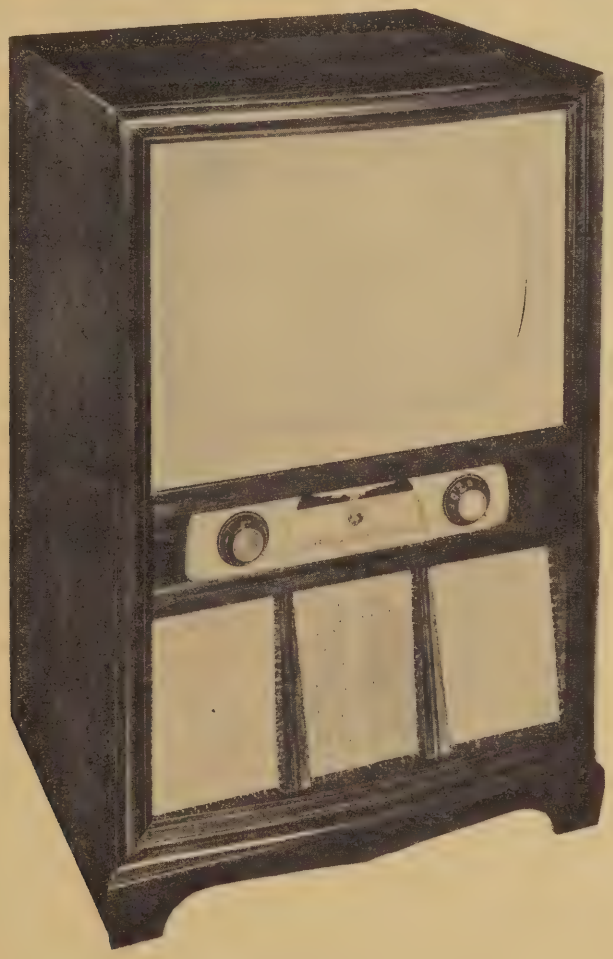

MODEL 21C36

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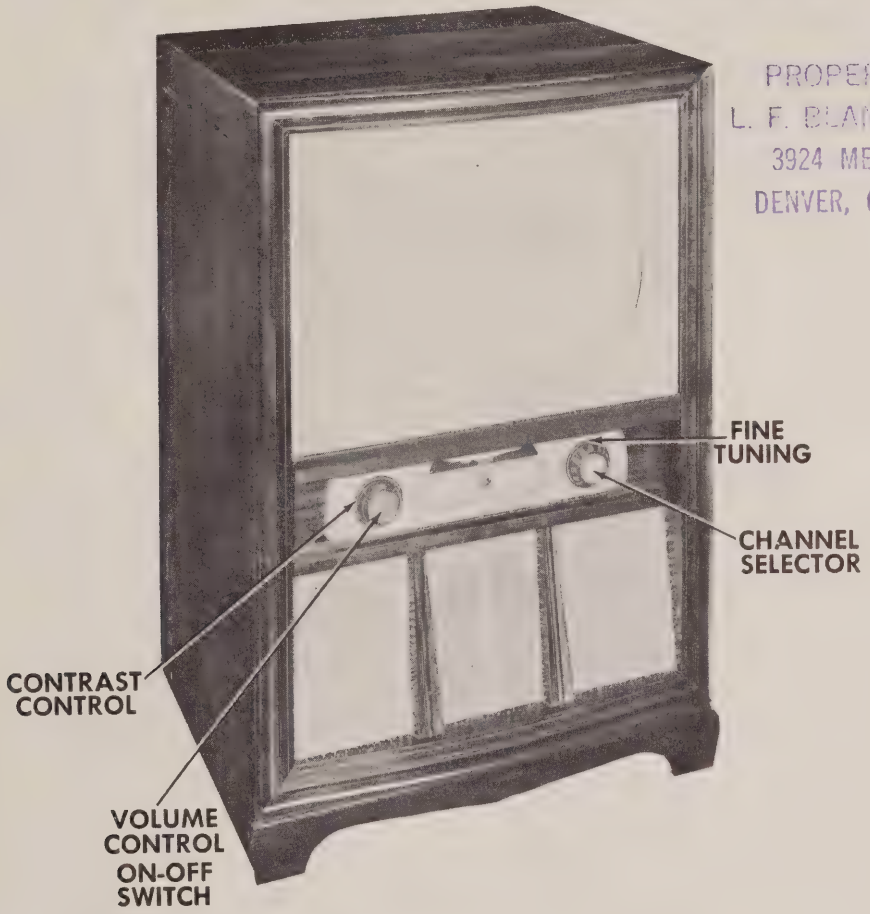

MAJESTIC MODEL 21C36

TRADE NAME	Majestic Models 21C36, 21C37, 21C38, 21C39, 21D56, 21D57, 21D58, 21D59, 21T22, 21T23 (Series 116)
MANUFACTURER	Majestic Radio & Television, Division of Wilcox-Gay Corp., 70 Washington St., Brooklyn, N. Y.
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC - 60 Cycle RATING 1.64 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 24.75MC, Sound IF 20.25MC (Intercarrier)

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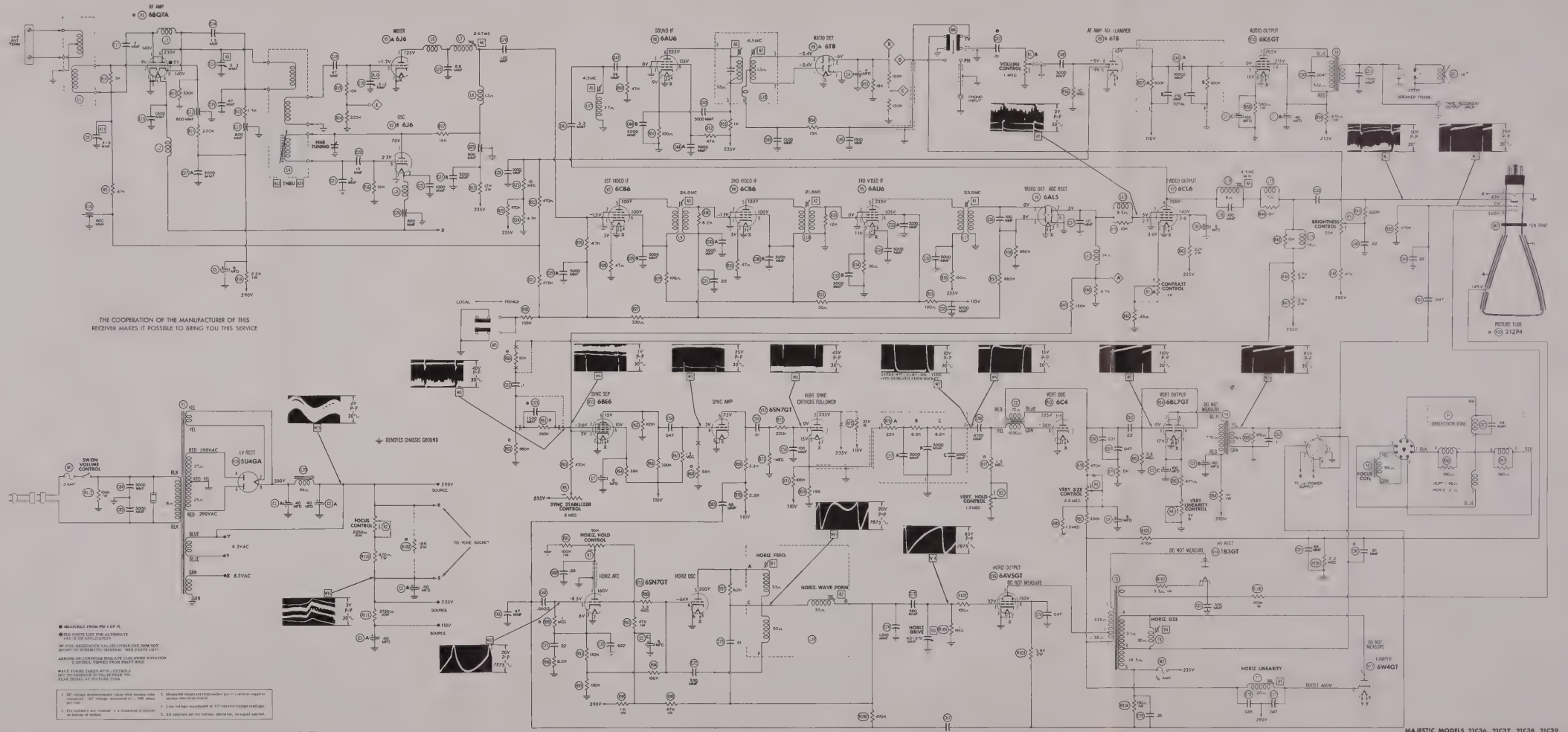
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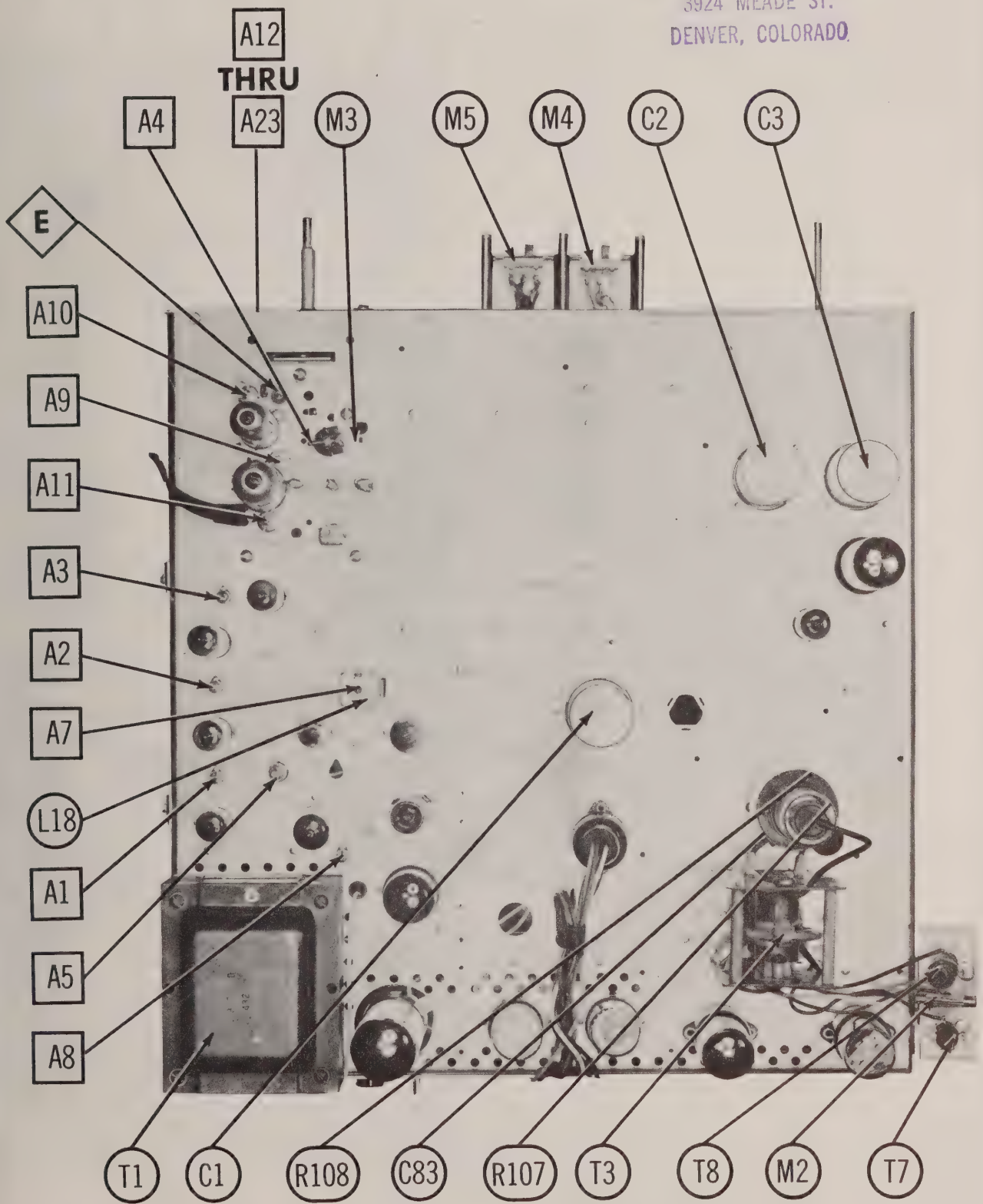

CHASSIS TOP VIEW

SET 280 FOLDER 5

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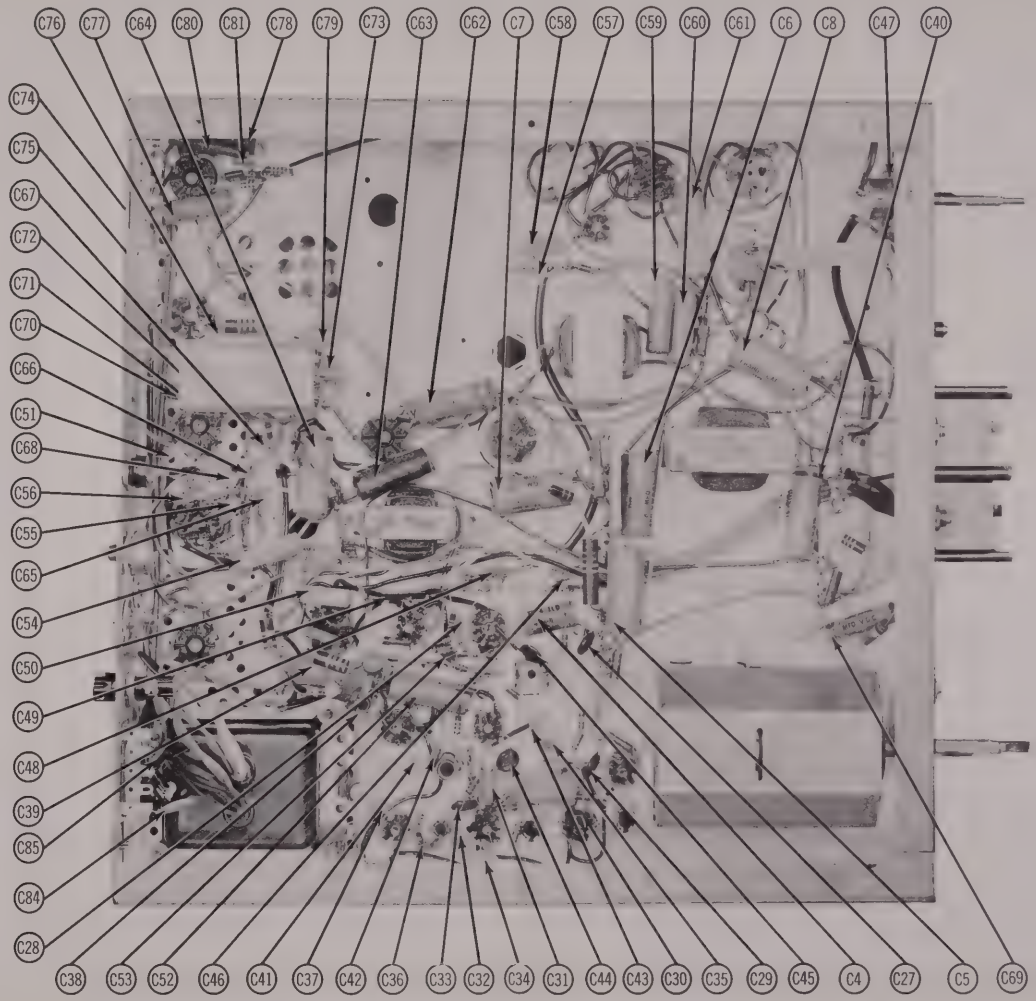

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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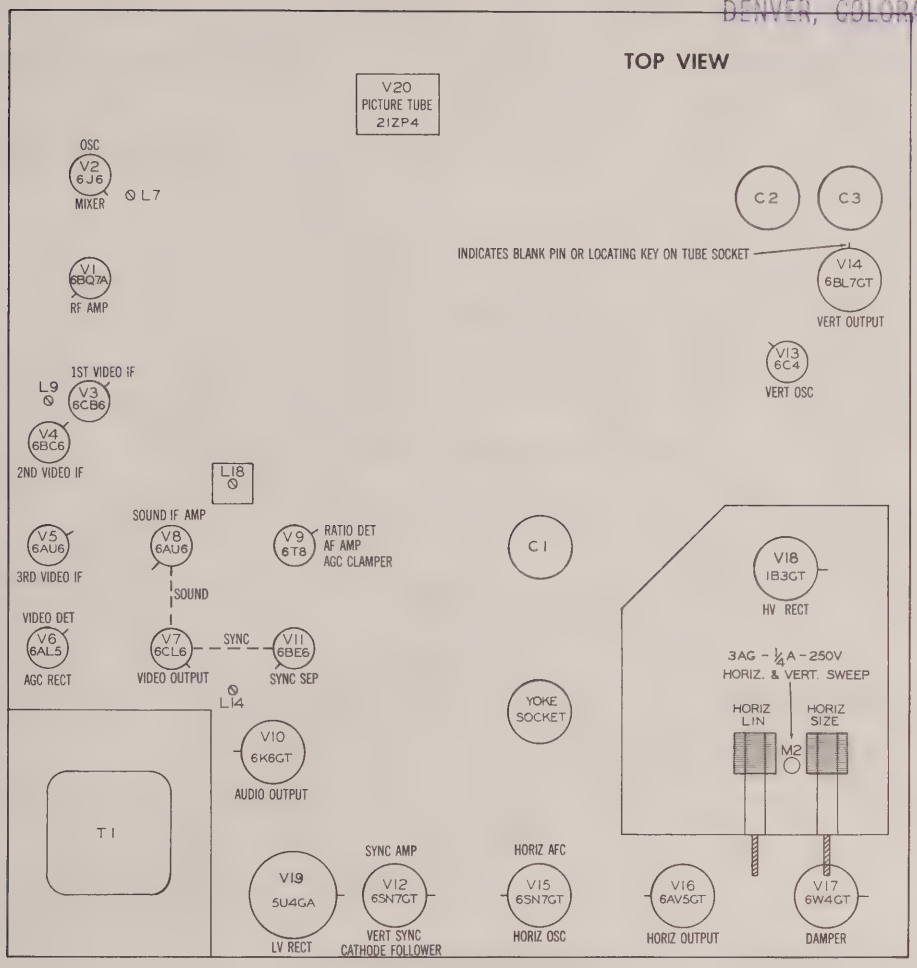
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V7**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V20**
Has pic, no sound - **V8, V9, V10**
Overloaded picture - **V9**

SYNC FAILURE
No vert. sync - **V12, V13**
No horiz. sync - **V12, V15**
No vert. or horiz. sync - **V11, V12**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20 Fuse (M2)**
No vertical deflection - **V13, V14**
Poor vert. linearity or foldover - **V13, V14**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V12, V13**
Horiz. off freq. - **V12, V15**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Set the contrast control maximum counter clockwise.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C29A. Positive lead to chassis.
Remove the converter tube (V2) from its socket and replace with a 6J6 with pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23.2MC (Unmod)	Any	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection. Attenuate signal generator to maintain not more than 1.5 volts at VTVM.
2.	"	"	21.8MC	"	"	A2	"
3.	"	"	24.0MC	"	"	A3	"
4.	"	"	24.7MC	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23MC (10MC Swp)	20.25MC 21.75MC 24.75MC	Any	Vert. amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 1. If necessary, retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set the "TV-Phono" switch for TV position.
Connect two matched 100KΩ (±1%) resistors in series from point Ⓑ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.0015MFD	High side to pin 9 (grid) of 6CL6 (V7). Low side to chassis.	4.5MC (unmod)	Any non-interfering channel.	DC probe to point Ⓑ. Common to chassis.	A5, A6	Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point Ⓓ. Common to point Ⓒ.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set "TV-Phono" switch for TV position.
Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.0015MFD	High side to pin 9 (grid) of 6CL6 (V7). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel.	Vert. amp. to point Ⓑ. Low side to chassis.	A5, A6	Disconnect stabilizer capacitor (C4). Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
7.	"	"	"	"	"	Vert. amp. to point Ⓓ. Low side to chassis.	A7	Reconnect stabilizer capacitor (C4). Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Remove 3rd IF tube (V5) from its socket. Short out L17 with a short jumper.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.0015MFD	High side to pin 9 (grid) of 6CL6 (V7). Low side to chassis.	4.5MC (30% Mod)	Any	DC probe thru detector (Fig. 4) to pin 11 (cathode) of picture tube	A8	Adjust for MINIMUM deflection. Attenuate generator to maintain not more than .1 volt on VTVM.

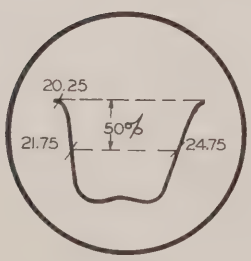


FIG. 1

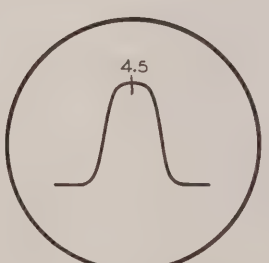


FIG. 2

FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

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RF AND MIXER ALIGNMENT

Remove bias battery used in "Video IF Alignment" and connect a short across C29A.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to point E . Low side to chassis.	A9, A10, A11	Adjust for response similar to Fig. 5. with markers at not less than 70%.
10.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check all channels for proper marker placement. If markers fall below 70% on any channel, make slight compromise adjustments of A9, A10 and A11 with channel selector set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

OSCILLATOR ALIGNMENT

The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel selector switch is turned to each channel.
Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 10KΩ to point A . Low side to chassis.	A12	Adjust to place sound marker as shown in Fig. 6. Video marker should be at 50% response.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

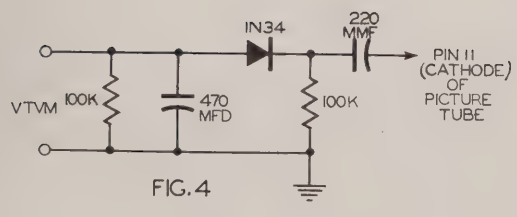


FIG. 4

FIG. 5

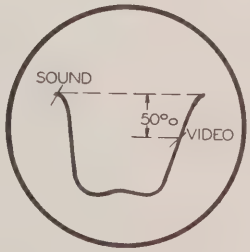
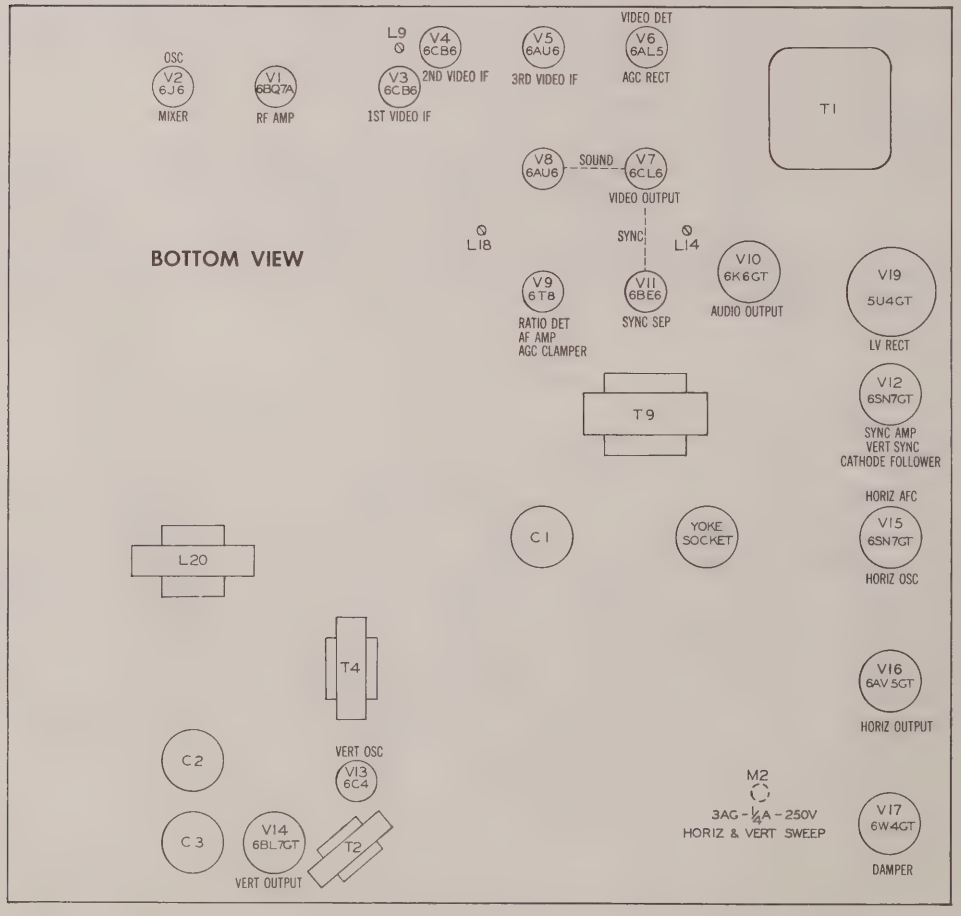


FIG. 6

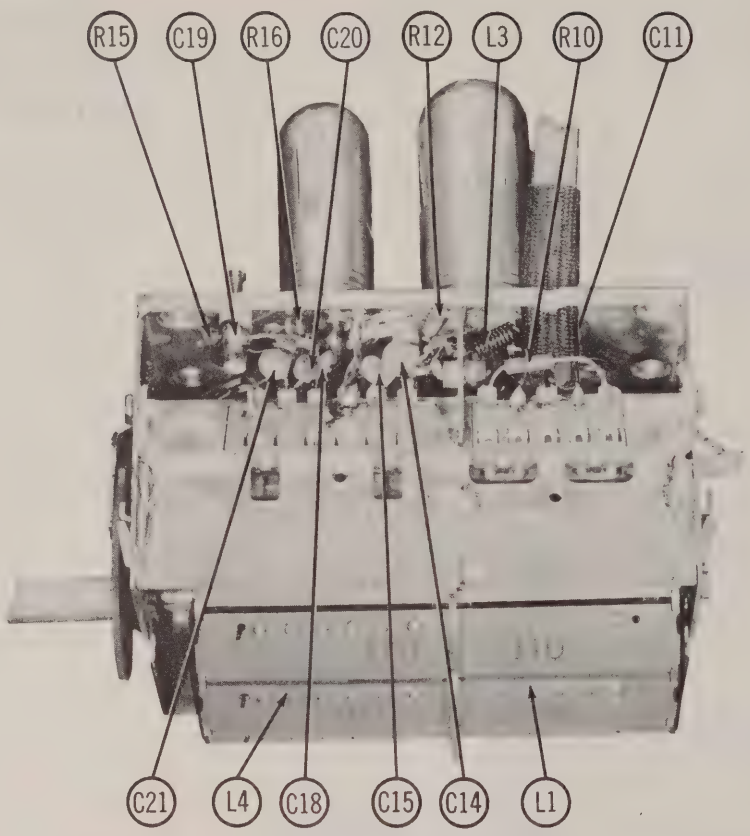
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1. 5Meg	0Ω	. 1Ω	0Ω	†4KΩ	†110KΩ	INF	0Ω
V 2	6J6	†27KΩ	†12. 5KΩ	. 1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	1. 2Meg	47Ω	0Ω	. 1Ω	†4. 4KΩ	†4. 4KΩ	0Ω		
V 4	6CB6	1. 2Meg	47Ω	0Ω	. 1Ω	†4. 4KΩ	†4. 4KΩ	0Ω		
V 5	6AU6	. 7Ω	0Ω	0Ω	. 1Ω	†500Ω	†4. 2KΩ	150Ω		
V 6	6AL5	. 7Ω	680KΩ	. 1Ω	0Ω	0Ω	0Ω	4. 7KΩ		
V 7	6CL6	250Ω	4. 7KΩ	†22KΩ	. 1Ω	0Ω	†5. 8KΩ	0Ω	†22KΩ	4. 7KΩ
V 8	6AU6	47KΩ	0Ω	0Ω	. 1Ω	†1. 4KΩ	†47KΩ	100Ω		
V 9	6T8	INF	18KΩ	INF	. 1Ω	0Ω	1. 5Meg	0Ω	10Meg	†500KΩ
V 10	6K6GT	NC	0Ω	†1. 4KΩ	†900Ω	500KΩ	TP	. 1Ω	560Ω	
V 11	6BE6	120KΩ	0Ω	0Ω	. 1Ω	†100KΩ	†40KΩ	1Meg		
V 12	6SN7GT	1. 2Meg	†400Ω	15KΩ	56KΩ	†9. 6KΩ	0Ω	. 1Ω	0Ω	
V 13	6C4	▲1. 8Meg	0Ω	0Ω	. 1Ω	▲1. 8Meg	2Meg	0Ω		
V 14	6BL7GT	2. 2Meg	†2KΩ	1KΩ	2. 2Meg	†2KΩ	1KΩ	. 1Ω	0Ω	
V 15	6SN7GT	1. 2Meg	†50KΩ	330KΩ	280KΩ	†50KΩ	0Ω	0Ω	. 1Ω	
V 16	6AV5GT	1Meg	. 1Ω	0Ω	NC	▲52Ω	NC	0Ω	†6KΩ	
V 17	6W4GT	TP	NC	700KΩ	NC	†400Ω	NC	30KΩ	30KΩ	
V 18	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ▲390Ω
V 19	5U4GA	NC	30KΩ	NC	27Ω	TP	25Ω	TP	30KΩ	
V 20	21ZP4	0Ω	470KΩ	Pin 10 ▲400KΩ	Pin 11 †240KΩ	Pin 12 . 1Ω				

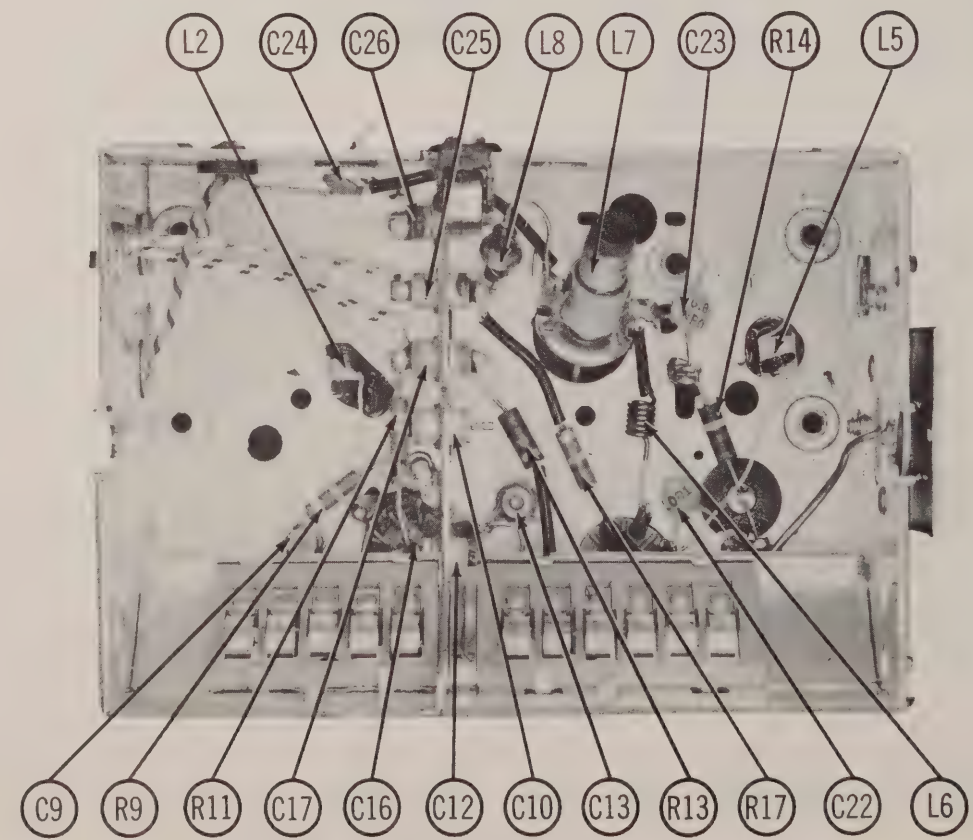
† MEASURED FROM PIN 8 OF V19.
▲ MEASURED FROM PIN 3 OF V17.
NC – NO CONNECTION
TP - TIE POINT



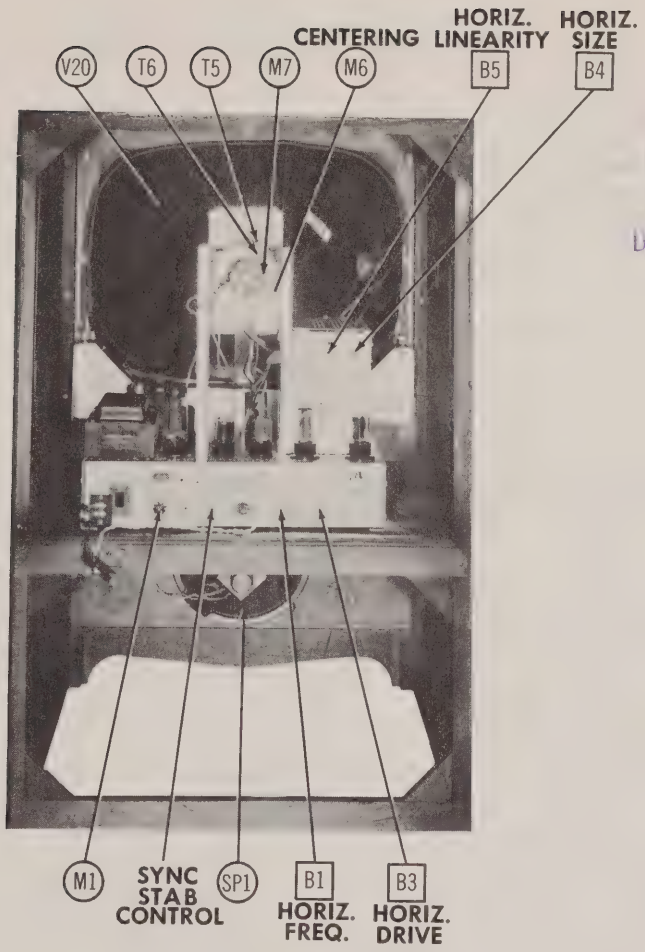
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



PROPERTY OF
[illegible] BLANKENSHIP
2324 MEADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station, preferably a test pattern.

Turn the horizontal hold control fully counter clockwise.

If the picture is out of sync, adjust the horizontal frequency slug (B1) until the picture synchronizes. Momentarily interrupt the signal by switching off channel, then back. The picture should just fall out of sync. If it does not, turn B1 slightly clockwise and again interrupt the signal. Continue this procedure until the picture just falls out of sync only when signal is interrupted. Rotate the horizontal hold control clockwise until picture falls into sync. The picture should remain in sync throughout most of the range of the horizontal hold control. If the picture does not hold sync, it may be necessary to adjust the horizontal waveform slug (B2). Connect the vertical amplifier of an oscilloscope through 10KΩ to terminal "C" of L19. Connect the low side to chassis. If necessary, adjust B2 to obtain waveform similar to Fig. 7.

During adjustment of B2, keep picture in sync by adjusting B1.

Adjust the horizontal drive trimmer (B3) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture. Adjust the horizontal size slug (B4) for a picture slightly wider than necessary to fill the mask horizontally.

Adjust the horizontal linearity slug (B5) for a picture that is symmetrical from left to right.

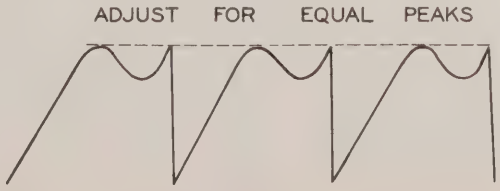


FIG. 7

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17 and V19. Check adjustments B3, B4 and B5. Check T3, T5A, C75, R103, R104 and other associated components.

DRIVE LINES

Check by substitution V16 and V17. Check adjustments B3 and B5. Check C75, C67, R103 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V16 and V17. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V15, V16 and V17. Check C71, C70, R96 for open. Check L19, R97, R91, C68 and other associated components.

XMAS TREE EFFECT

Check by substitution V15, V16 and V17. Check T3 and T5 for internal arcing. Check C67, C66, C72, R97, R92 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V13 and V14. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R84, C3B and other associated components.	Check T2, C58, C61, C8, R81, R6, R77 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V13 and V14. Check vertical size and vertical linearity controls for proper operation. Check R78, T4 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V13 and V14. Check C61, C60, T2, R78, R81, R6 and other associated components.

COMPRESSED AT TOP

Check by substitution V13 and V14. Check C3C, R4, R83, T4, T5B and other associated components.

FOLDS

Check by substitution V13 and V14. Check C59, C60, C61, R79, R83, T4 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V11 and V12. Check C52, C54, C53, C55, R64, R66, R70, R69 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V13. Check vertical integrator network. Check C58, R77, R3, T2 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V15. Check C65, C68, R92, R91, R7, L19 and other associated components.

HORIZONTAL BENDING

Check by substitution V11, V12 and V15. Check components associated with V15.

VIDEO

LOSS OF VIDEO

Substitute V7. Check C39, R43, R47, R46, L12 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A8. Check video IF alignment.

POOR CONTRAST

Substitute V7. Check contrast control. Check L15, L16, R44, R42, C39 and other associated components.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check R46, R47, R44, R45, L16, L15 and other associated components.

SMEAR

Substitute V7. Check video detector network. Check L12, L13, L15, L16, C39 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stages V9 and V10 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C47, C48, C49, C50, C1B, C1C, R59, R57, T9, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A7 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check M1 fuse. Check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V19. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V19. Check B+ filter and decoupling network.

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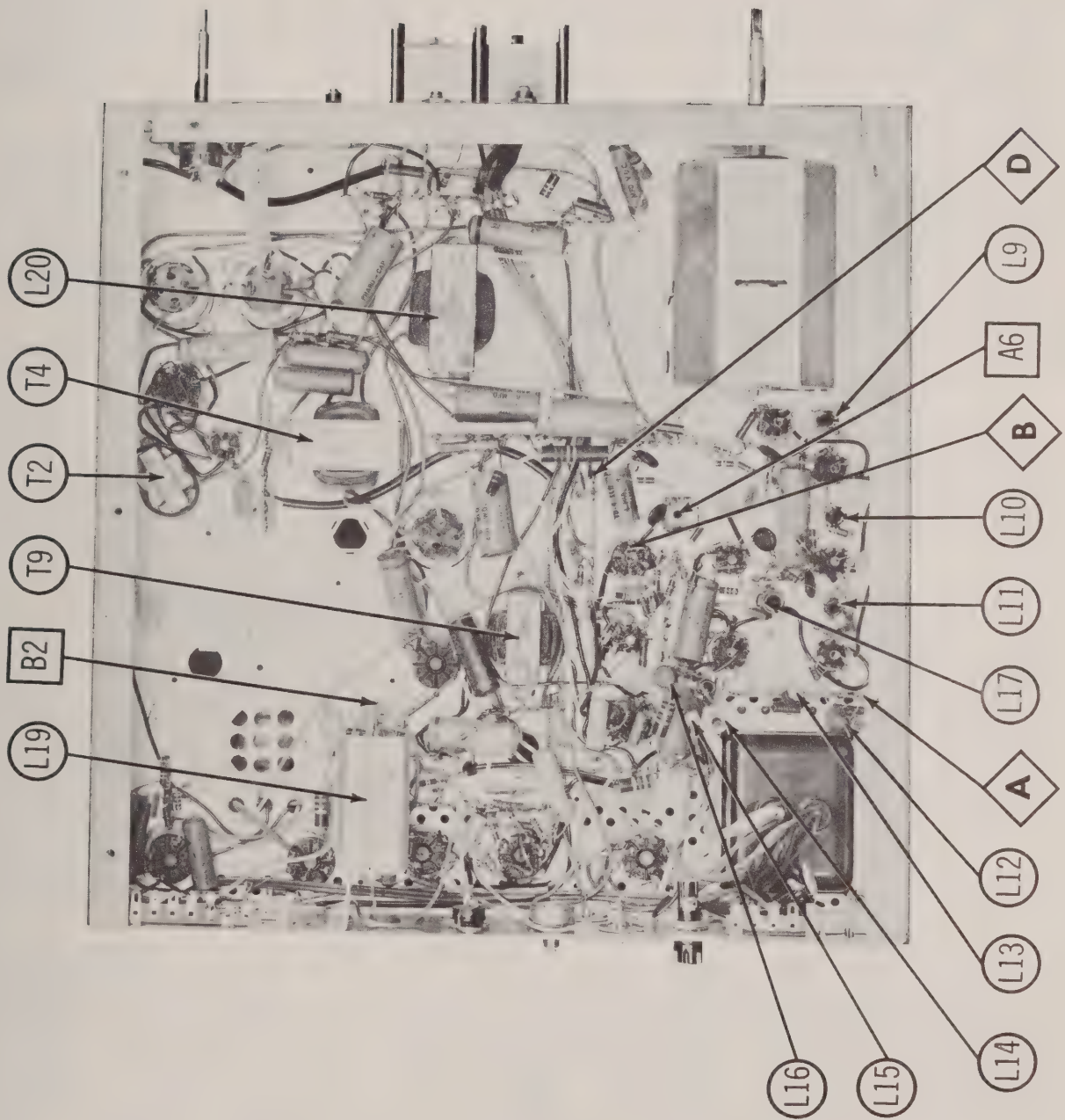


MAJESTIC MODELS 21C36, 21C37, 21C38, 21C39,
21D56, 21D57, 21D58, 21D59, 21T22, 21T23 (Series 116)

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
[illegible]
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MAJESTIC PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6SQ7A	6SQ7A	9AJ	6BZ7 used as an alternate
V2	Mixer-Osc.	6J8	6J8	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6AU6	6AU6	7BK	
V6	Video Det.- AGC Rectifier	6AL5	6AL5	6BF	
V7	Video Output	6CL6	6CL6	9BV	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Detector-AF Amp.-AGC Clamper	6T8	6T8	9E	
V10	Audio Output	6K8GT	6K8GT	7S	
V11	Sync Separator	6SR6	6SR6	7CH	
V12	Sync Amp.- Vert. Sync - Chasbie Follower	6SN7GT	6SN7GT	8BD	
V13	Vert. Osc.	6C4	6C4	6BG	
V14	Vert. Output	6BL7GT	6BL7GT	8BD	
V15	Ratio. Osc. - Horiz. AFC	6SN7GT	6SN7GT	8BD	
V16	Horiz. Output	6AV5GT	6AV5GT	6CK	
V17	Damper	6W6GT	6W6GT	6CQ	
V18	HV Rectifier	1B3GT	1B3GT	3C	
V19	LV Rectifier	5U4GA	5U4GA	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MAJESTIC PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V20	21ZP4	21ZP4A ① 21ZP4B ①②	21ZP4A ① 21ZP4B ①②	21ZP4 21ZP4A ① 21ZP4B ①②	21ZP4 21ZP4A ① 21ZP4B ①②	12D 12N 12N	① Circuit change necessary. ② Aluminized

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MAJESTIC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	±40	450	C-5.435-1			FP375	TM-3057	T-720	
B	±40	450							
C	±100	50							
C2A	±40	450	C-5.435-6			FP376.8	TM-404010-450	T-165	
B	±40	450							
C	±8	450							
C3A	±40	450	C-5.435-1			FP375	TM-3057	T-720	
B	±40	450							
C	±100	50							
C4	6	100	C-5.430-1			TC40	TD-4-150	FM-1504	
C5	8	450				TC71	TD-8-450	FM-4508	
C6	8	450				TC71	TD-8-450	FM-4508	
C7	8	450				TC71	TD-8-450	FM-4508	
C8	8	450		829-10		TC71	TD-8-450	FM-4508	
C10	800								
C11	3			TCZ-3	NP0A-030	2T-5533			
C12	800								
C13	.5-3			829-3	31I5-01-0R5	CT36SA			
C14	1.5			TCZ-1.5	NP0A-1R5	2T-5515			
C15	47			D6-470	831-470	UC-5447			
C16	1000			DD-102	801-001	DC-531			
C17	800								
C18	47			D6-470	831-470	UC-5447			
C19	.5-3			829-3	31I5-01-0R5	CT36SA			
C20	10			TCN-10	N750K-100	UC-541			
C21	5								
C22	1000			DD-102	801-001	DC-531			
C23	6.8			TCZ-6.8	NP0A-6R8	2T-5568			
C24	120			D6-121	811-121	UC-5312			
C25	800								
C26	±00								
C27A	5000		B-4.125-1	DD5-502	811-005	DC-525			
B	5000				811-005	DC-525			
C28	5000		B-4.125-1	DD-502	811-005	DC-525			
C28A	5000		B-4.125-1	DD2-502	811-005	DC-525			
B	5000				811-005	DC-525			
C30A	5000		B-4.125-1	DD5-502	811-005	DC-525			
B	5000				811-005	DC-525			
C31	.22	200	D-3.100-30			PT4022	IMP2-P22	3302122	
C32	5000		B-4.125-1	DD-502	811-005	DC-525		C-1250	
C33	5000		B-4.125-1	DD2-502	811-005	DC-525		C-1250	
B	5000				811-005	DC-525		C-1250	
C34	5000		B-4.125-1	DD-502	811-005	DC-525		C-1250	
C35	5000		B-4.125-1	DD-502	811-005	DC-525		C-1250	
C36	100		C-4.109-10	D6-101	831-101	DC-5331		K-1310	
C37	10		C-4.109-18	D6-100	GP1K-100	UC-541		K-1410	
C38	100	500	D-4.104-28	TCZ-100	NP0-333-101	MC3S25		KR-1310	
C39	.1	600	D-3.105-31	DP-104		PT801	IMP0-P1	330801	
C40	.22	400	D-3.105-23			PT4022	IMP4-P22	3304022	
C41	3.3		C-4.111-8	TCZ-3.3	NP0A-3R3	2T-5333			
C42	39	500	D-4.104-21	TCZ-39	NP0K-390	MC3S23		KR-1439	
C43	5000		B-4.125-1	DD-502	811-005	DC-525		C-1250	
C44	5000		B-4.125-1	DD2-502	811-005	DC-525		C-1250	
B	5000				811-005	DC-525		C-1250	
C45	1500		D-4.108-12	DD-152	801-0015	DC-5315		C-1215	
C46	1500		D-4.108-13	DD-152	801-0015	DC-5315		C-1215	
C47	.01	600		D6-103	GP3-333-103	PT801	IMP0-S1	330611	Note 1

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MAJESTIC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C48	5000		B-4.125-1	DD-502	811-005	DC-525	IMP2-D5	C-1250	
C49A	10000								
B	250		†2S-10.103	†DC-80	†1404-01				
C									
C50	.0047	600	D-3.105-39	D6-472	GP3-333-472	PT8347	IMP6-D47	3306347	
C51	.01	600	D-3.105-13	D6-103	801-0015	DC-5315		C-1315	
C52	.1	600	D-3.105-21	DP-104		PT801	IMP6-P1	330801	
C53	1500			D6-153	GP3L-152	UC-5215		C-1215	Note 2
C54	.047	400	D-3.105-18	DF-503		PT4347	IMP4-S47	3304347	
C55	.01	600	D-3.105-16	D6-103	GP3-333-103	PT801	IMP6-S1	330811	
C56	100		D-4.104-28	D6-101	GP1K-101	UC-531		K-1310	
C57A	3000					DC-522	IMP5-D3	C-1220	
B	5000		±B-10.101	±PC-100	±1605-01	DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C58	4700	500	D-4.105-34			MC3H65		CR-1247	
C59	.047	600	D-3.105-58						
C60	.035	500	D-3.100-46						
C61	.22	400	D-3.105-23			PT4022	IMP4-P22	3304022	
C62	.1	600	D-3.105-31	DP-104		PT801	IMP6-P1	330801	
C63	.047	600	D-3.105-34	DF-503		PT6347	IMP6-S47	3306347	
C64	.22	400	D-3.105-23			PT4022	IMP4-P22	3304022	
C65	68	500	D-4.104-28	TCZ-68	NP0L-680	2T-5468		KR-1468	
C66	47		C-4.109-14	TCZ-47	NP0K-470	2T-5447		KM-1447	
C67	47		C-4.109-14	TCZ-47	NP0K-470	2T-5447		KM-1447	
C68	.0022	600	D-3.105-36	D6-223	GP3-333-222	PT6223	IMP6-D22	3306222	
C69	.05	400	D-3.105-17	DF-503		PT4S15	IMP4-S5	330415	
C70	.022	400	D-3.105-17	DF-303	417-02	PT4S22	IMP4-S22	3304122	
C71	.22	200	D-3.100-30			PT4022	IMP2-P22	3302022	
C72	330	500	D-4.104-58					KR-1333	
C73	.01	600	D-3.105-1						
C74	1200	500	D-4.105-9					CR-1222	
C75	560	500	D-4.104-70					KR-1256	
C76	.047	600	D-3.105-34	DF-503		PT6347	IMP6-S47	3306147	
C77	.047	600	D-3.105-58						
C78	.035	600	D-3.100-46						
C79	.25	200	D-3.100-30			PT4025	IMP2-P25	3302035	
C80	30	3000							Note 3
C81	68	2000	B-4.129-4	DD30-680	3KV-680	DC30468			
C82	56	2000	B-4.129-6	DD30-560	3KV-560	DC30456			
C83	500	20000	B-4.138		TV3-502	413	HV20035A		
C84	5000	1000	B-4.138						
C85	5000	1000	B-4.138						

Note 1. Some versions use .047MFD in this application (part #B-3.105-19).
Note 2. Not used in some versions.
Note 3. Some versions use 330MMF in this application (part #B-4.129-2).
† Items C49A, C49B, C49C, R57A and R57B are combined in one unit.
When replacing items separately C49B and C49C should be a 250MMF.
• Items C57A, C57B, C57C, R76A, R76B and R75C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	C-8.230-3	*QJ-561	RTV-444	F1-5	UF13R	Contrast - Panel
B	1Meg	½				R2-52	UR16A	Volume - Rear
C	Switch					KB-1	US-26	Attach to R1B
R2	2250Ω	4	C-8.221		RTV-319	WA-226	MZ.5MPX	Focus (Wire wound)
R3A	1.5Meg	½	C-8.229-10	QJ1-158	A47-15Meg-S	AB-75	U-155	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R3A
R4A	500Ω	½	C-8.227-8	QJ1-154	A47-500Ω-S	AB-50	BU-14	Vert. Linearity - Note
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	100Ω	½	C-8.229-9	QJ1-178	A47-100K-S	AB-40	U-41	Brightness
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R5A
R6A	2.5Meg	½	C-8.219-5	QJ1-239	A47-2.5Meg-S	AB-83	BU-565	Vert. Size
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	50KΩ	½	C-8.229-7	QJ1-123	A47-50K-S	B-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R7A
R8A	5Meg	½	C-8.218-1	QJ1-161	A47-5Meg-S	AB-87	BU-67	Sync Stabilizer
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R8A

Note: Some versions may use an alternate control part no. C-8.210-5.
* CONCENTRATE EQUIVALENT: KIT K-4, BASE ELEMENTS & SHAFTS: B17-108 & P1-128 (PANEL)
B13-127 & R1-210 (REAR)
76-1 SWITCH

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	NOTES
R9	470K	½		BTS-470K	
R10	15KΩ	½		BTS-15K	
R11	220KΩ	½		BTS-220K	
R12	330KΩ	½		BTS-330K	
R13	1500Ω	½		BTS-1500	
R14	220KΩ	½		BTS-220K	
R15	10KΩ	½		BTS-10K	
R16	10KΩ	½		BTS-10K	
R17	15KΩ	½		BTS-15K	
R18	2200Ω	½	D-7.102-38	BTA-2200	
R19	12KΩ	2	D-7.101-132	BTS-12K	
R20	100KΩ	½	D-7.101-100	BTS-100K	
R21	470KΩ	½	D-7.101-129	BTS-470K	
R22	47Ω	½	D-7.101-3	BTS-47Ω	
R23	10Meg	½	D-7.101-122	BTS-10Meg	
R24	4700Ω	½	D-7.101-44	BTS-4700	
R25	470KΩ	½	D-7.101-128	BTS-470K	
R26	4700Ω	½	D-7.101-44	BTS-4700	
R27	330Ω	½	D-7.101-237	BTS-330	
R28	47Ω	½	D-7.101-250	BTS-47	
R29	100Ω	½	D-7.101-228	BTS-100	
R30	8200Ω	½	D-7.101-55	BTS-8200	
R31	47Ω	½	D-7.101-250	BTS-47	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	NOTES
R32	100Ω	½	D-7.101-226	BTS-100	
R33	12KΩ	½	D-7.101-83	BTS-12K	
R34	150Ω	½	D-7.101-248	BTS-150	
R35	100Ω	½	D-7.101-226	BTS-100	
R36	150Ω	½	D-7.101-204	BTS-150	
R37	680KΩ	½	D-7.101-134	BTS-680K	
R38	680KΩ	½	D-7.101-134	BTS-680K	
R39	10KΩ	½	D-7.101-58	BTS-10K	
R40	4700Ω	½	D-7.101-44	BTS-4700	
R41	150KΩ	½	D-7.101-107	BTS-150K	
R42	33Ω	½	D-7.101-259	BTS-33	
R43	22KΩ	½	D-7.103-142	BTS-22K	
R44	15KΩ	½	D-7.101-85	BTS-15K	
R45	15KΩ	½	D-7.101-85	BTS-15K	
R46	2700Ω	2	D-7.103-104	BTS-2700	
R47	2700Ω	2	D-7.103-104	BTS-2700	
R48	47KΩ	½	D-7.101-87	BTS-47K	
R49	220KΩ	½	D-7.101-114	BTS-220K	
R50	47KΩ	½	D-7.101-87	BTS-47K	
R51	100Ω	½	D-7.101-226	BTS-100	
R52	47KΩ	½	D-7.101-86	BTS-47K	
R53	1000Ω	½	D-7.101-17	BTS-1000	
R54	15KΩ	½	D-7.101-86	BTS-15K	

RESISTORS (cont)

ITEM No	RATING: OHMS	WATT	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	NOTES
R55	10KΩ	½	D-7.101-89	BTS-10K	
R56	10 Meg	½	D-7.101-192	BTS-10 Meg	
R57A	500KΩ	½	†B-10.103	†BTS-470K BTS-470K	
B	500KΩ	½		BTS-560	
R58	560Ω	1	D-7.102-13	BTA-560	
R59	470Ω	1	D-7.102-10	BTA-470	
R60	10KΩ 5%	½		BTS-10K 5%	Note 1
R61	390KΩ	½		BTS-390K	Note 1
R62	680KΩ	½		BTS-680K	Note 1
R63	470KΩ	½	D-7.101-129	BTS-470K	
R64	39KΩ	½	D-7.101-83	BTS-39K	
R65	100KΩ	½	D-7.101-100	BTS-100K	
R66	390KΩ	½	D-7.101-125	BTS-390K	
R67	1.5Meg	½	D-7.101-148	BTS-1.5Meg	
R68	56KΩ	½		BTS-56K	Note 1
R69	3300Ω	½	D-7.101-37	BTS-3300	
R70	2200Ω	½	D-7.101-30	BTS-2200	
R71	100KΩ	½	D-7.101-100	BTS-100K	
R72	1Meg 5%	½	D-7.101-143	BTS-1.0Meg 5%	
R73	220KΩ	½	D-7.101-115	BTS-220K	
R74	15KΩ	½	D-7.101-86	BTS-15K	
R75	33KΩ	½	D-7.101-80	BTS-33K	Note 1
R76A	22KΩ	½		BTS-22K	
B	8200Ω	½	±B-10.101	BTS-8200	
C	8200Ω	½		BTS-8200	
R77	1.5Meg	½		BTS-1.5Meg	Note 3
R78	470KΩ	½	D-7.101-129	BTS-470K	
R79	10KΩ 5%	½	D-7.101-58	BTS-10K 5%	
R80	1.5Meg	½	D-7.101-148	BTS-1.5Meg	
R81	330KΩ	½	D-7.101-123	BTS-330K	
R82	2.2Meg	½	D-7.101-156	BTS-2.2Meg	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	NOTES
R83	470Ω	1	D-7.101-3	BTS-47Ω	
R84	1000Ω	1	D-7.102-24	BTA-1000	
R85	470KΩ	1	D-7.101-129	BTS-470K	
R86	560Ω	1	D-7.101-6	BTS-560	
R87	560Ω	1	D-7.101-6	BTS-560	
R88	470Ω	1	D-7.101-3	BTS-470	
R89	1Meg	½		BTS-1Meg	Note 4
R90	3.3Meg	½	D-7.101-171	BTS-3.3Meg	
R91	100KΩ	2	D-7.102-108	BTA-100K	
R92	47KΩ	1	D-7.102-94	BTA 47K	
R93	150KΩ	½	D-7.101-107	BTS-150K	
R94	100KΩ 5%	½	D-7.101-99	BTS 100K 5%	
R95	180KΩ	½	D-7.101-121	BTS-180K	
R96	8200Ω	½	D-7.101-55	BTS-8200	
R97	8200Ω	½	D-7.101-55	BTS-8200	
R98	47KΩ	1	D-7.102-94	BTA-47K	
R99	1000Ω	1	D-7.102-24	BTA-1000	
R100	470KΩ	½	D-7.101-28	BTS 470K	
R101	1Meg	½	D-7.101-42	BTS-1Meg	
R102	100Ω	½	D-7.101-226	BTS-100	
R103	5600Ω	2	D-7.103-118	BTH-5600	
R104	150Ω	1	D-7.102-74	BTA 153	
R105	470KΩ	½	D-7.101-128	BTS-470K	
R106	3.3Meg	½	D-7.101-156	BTS-3.3Meg	
R107	3.3Ω	1	C-8.212-1		
R108	470KΩ	½	D-7.103-137	BTA-470K	
R109	18KΩ	2	D-7.103-97	BTH-18K	Note 1
R110	470Ω	7	C-8.215-5		
R111	750Ω	10	C-8.215-6		
R112	100KΩ	1	D-7.103-100	BTA-100K	

† Items R57A, R57B, C49A, C49B and C49C are combined in one unit.
• Items R76A, R76B, R76C, C57A, C57B and C57C are combined in one unit.
Note 1: Not used in some versions.
Note 2: Some versions may use a 470KΩ resistor in this application.
Note 3: Some versions may use a 1.2Meg in this application.
Note 4: Some versions may use a 820KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI	SEC. 1	SEC. 2	MAJESTIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1.64A	660VCT @ .240ADC	5VAC @ 3A	D-8.280	P-8335 ①	P-3055				26R34 ②
	SEC 3	SEC 4	SEC 5							
	6.3VAC @ 1.2A	6.3VAC @ 4A								

① File cut mounting slots.
② Tape extra 6.3V@ 1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	MAJESTIC PART No	Halldorson PART No	Merit PART No	RCA PART No	Ram PART No	Stancor TYPE No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans.	C-8.230-4	B6702	A-3055	209T1 ①	V605	A-8125	24A87 ①	A-97X
T3	Horiz. Output Trans.	C-8.229-1	P3401*	HVO-79	23T17	3D23*	A-8281*	27L7-68*	FLY-68*
T4	Vert. Output Trans.	C-8.228-5	Z1803	A-3036		V308	A-8103	26S51 ①	A-99X ①
T5A	Yoke-Horiz. (DM2S)	C-8.254-3L	DF-805 ②	MDF-73 ②	222DM ② ④	Y70317 ②	DY51A ② ⑤	Y-9 ②	Y-12-1 ②
B	Vert. (47MS)								
T6	Focus Coil	C-8.234-1	EM700	MF-3			FC-12	FC-2	B-385-S
T7	Horiz.Lin.Coil (3-10MS)	B-L.533-1	RF500 ③	MWC-4 ③	213R1	30LH15	WC-8	WC-33	WC-13 ③
T8	Width Coil (6-43MS)	B-L.533-1	RF800 ③	MWC-8 ③	201R3A ①	WC-5 ①	WC-13 ③	WC-11 ③	

① Drill new mounting hole(s).
② Use original yoke cover and centering device.
③ Use original horizontal damping network, if necessary.
④ Refer to instructions packed with unit pertaining to horiz. damping network.
⑤ Remove damping network from terminals #3 and #7. Use original horiz. damping network, if necessary.
⑥ Connect horiz. damping network across terminals #1 and #2. Use original horiz. damping network, if necessary.
⑦ Enlarge mounting hole.
⑧ Connect to coded red and blue terminals.
⑨ Connect to terminals #1 and #2.
⑩ Connect to terminals #3 and #4.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	1	1	1	1	1	1	1	1
	2	2	2	HV Rect. Plate Lead 2	7	HV Rect. Plate Lead 7	HV Rect. Plate Lead 7	HV Rect. Plate Lead 2
	3	3	3	3	3	3	3	3
	4	4	4	8	4	4	4	4
	5	5	5	8	8	8	8	5
	6	6	6	4	6	6	6	6
Connect Width Coil Here	#4 & #8	#4 & #5	#4 & #5	#8 & #10	#4 & #8	#4 & #5	#4 & #8	#4 & #5

MAJESTIC MODELS 21C36, 21C37, 21C38, 21C39, 21D56, 21D57, 21D58, 21D59, 21T22, 21T23 (Series 116)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAJESTIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T9	8.2KΩ	3.9Ω	C-9.225-4	A-8114 ①	A-3020	S-9Z	Z1002	26S48	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MAJESTIC PART No.	VIKING PART No.	QUAM PART No.	
SP1	10"	PM	3.9Ω	30-334A	10J10	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MAJESTIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coils	0ΩCT	0Ω					
L2	Fil. Choke	0Ω						
L3	Neut. Coil	0Ω						
L4	RF, Mixer Grid, & Osc. Coils	0Ω						
L5	Fil. Choke	0Ω						
L6	RF Choke	0Ω						
L7	1st. Video IF	1Ω						
L8	RF Coil	1.3Ω						
L9	2nd. Video IF	.7Ω	.7Ω	C-1.553	17-1063	TV-116	6249	
L10	3rd. Video IF	.7Ω	.7Ω	C-1.553	17-1066	TV-116	6249	
L11	4th. Video IF	.7Ω	.7Ω	C-1.553	17-1063	TV-116	6249	
L12	Shunt Peaking Coil	14Ω		C-1.522-2	19-3500	TV-188	6174	470 Microhenries
L13	Series Peaking Coil	6.5Ω		C-1.522-4	19-3125		6153	126 Microhenries
L14	4.5MC Trap	8Ω		C-1.555	20-1004	TV-151	1469	
L15	Series Peaking Coil	7Ω		C-1.522-4	19-3125		6153	126 Microhenries
L16	Shunt Peaking Coil	14Ω		C-1.522-2	17-3500	TV-188	6174	470 Microhenries
L17	Sound IF	3.7Ω		C-1.529	20-1005	TV-151	1470	
L18	Ratio Det.	5.5Ω	1.8ΩCT	C-1.552	17-3497	TV-115	6205	Tertiary winding -.6Ω
L19	Horiz. Osc.	90Ω	37Ω	C-1.549	20-1402	TV-162	6183	Waveform winding -33Ω

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	MAJESTIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L20	.240ADC	69Ω	3.36HY	C-9.237-3	C-2334 ①	C-2991 ①	C-17X		20C49 ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MAJESTIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 250V			312003. (3AG-3A)	342001	AGC3	HKP
M2	3AG	1/4A 250V			318.250 (3AG-Pigtail)		GJV 1/4	

MISCELLANEOUS

ITEM No.	PART NAME	MAJESTIC PART No.	NOTES
M3	Tuner	E-36.151	VHF
M4	Switch		TV-Phono (DPDT-Slide type)
M5	Switch		Local-fringe (DPDT-Slide type)
M6	Centering Device		
M7	Ion Trap		
B3	Trimmer Cap.	B-4.119-2	Horiz. Drive (40-370MMF)

PROPERTY OF
L. F. BLANK
3024 MFA
DENV

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V15, V16, V17 and V18. Check M2 fuse. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T7, T8, C79, C77, C78, C76, R103 and other associated components.	Check L19, C69, C72, C73, C75, R99, R91, R92, R98 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17 and V19. Check C75, R103, R104, T3, T5A and other associated components. Check adjustments B3, B4 and B5.

BLOOMING

Check by substitution V16, V17, V18 and V19. Check R108, R103, C75 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V7. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

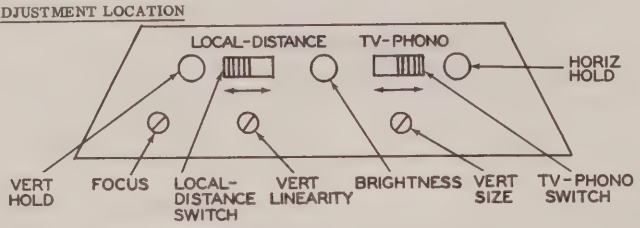
PICTURE TUBE SAFETY GLASS CLEANING

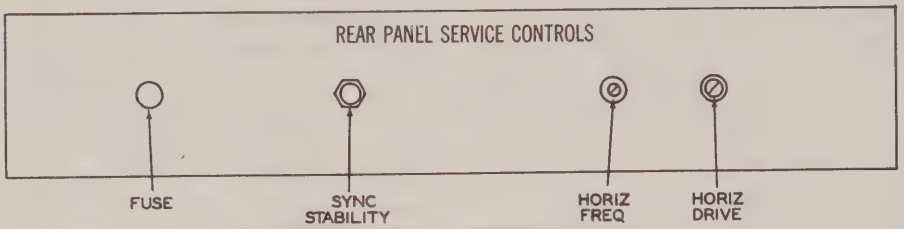
To clean safety glass, remove 4 wood screws holding plastic moulding at the bottom of safety glass. Remove plastic moulding and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION





SPECIAL ADJUSTMENTS - SYNC STABILITY CONTROL ADJUSTMENT

Tune in a weak station with high noise level. Adjust the sync stability control (R8) clockwise until horizontal and vertical sync are stable.

Tune in a strong station with low noise level. Check for stability of sync. If unstable, adjust R8 counter clockwise for stable sync.

Note: If R8 control needed adjustment on strong signal, make compromise adjustment of R8 for the two signal strengths.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal frequency slug of L19 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L18) located on top of chassis.

FUSES

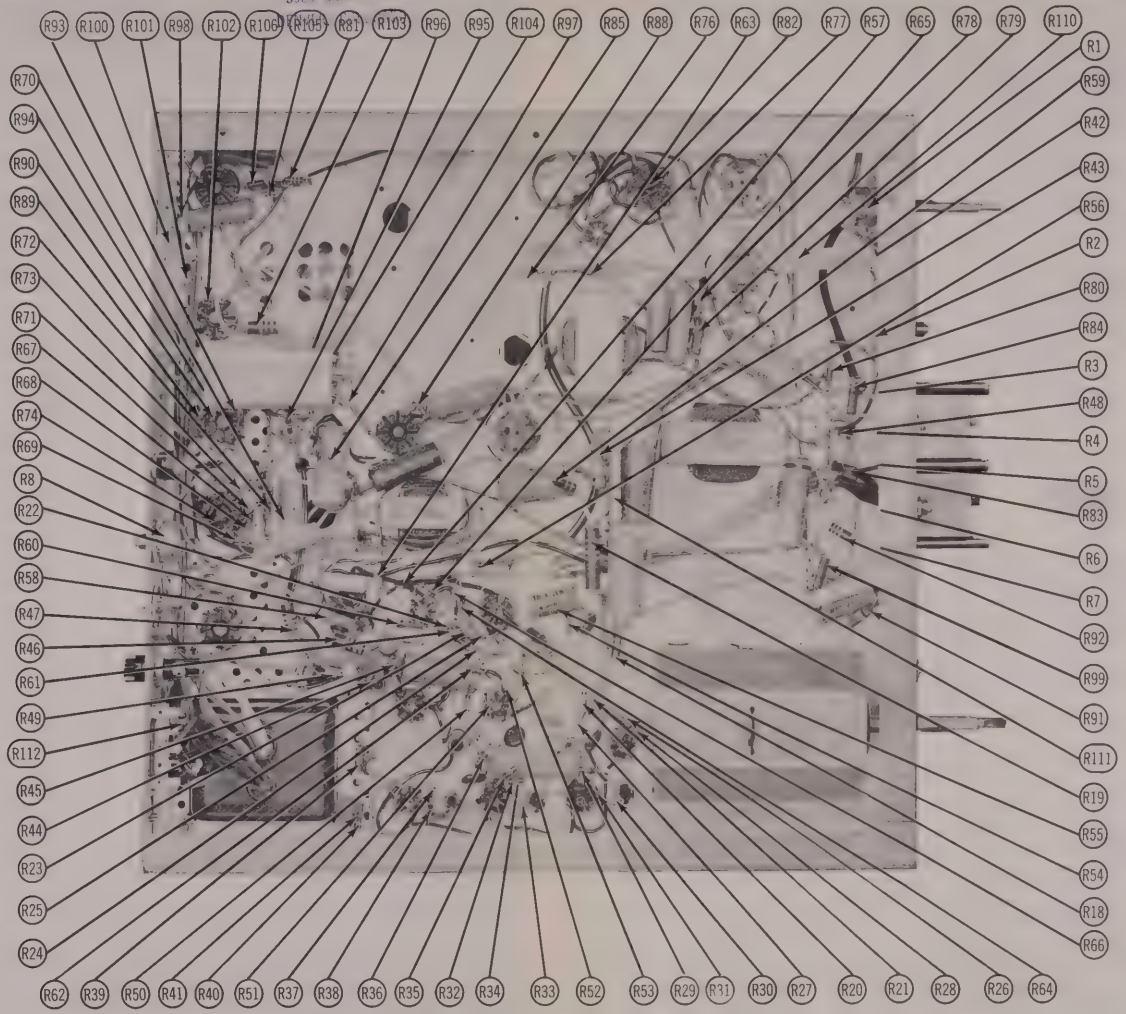
Two fuses are used. One for horizontal sweep circuit protection and one for LV power supply protection. (For location see tube placement chart.)

CENTERING

Centering is accomplished mechanically by positioning the focus coil. Adjust the three wing nuts located on the focus coil bracket until picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 9 wood screws. Remove rear cover.
3. Disconnect speaker plug from chassis.
4. Remove 8 chassis bolts. Remove chassis.
5. Remove 2 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MC GOHAN
MODEL MG-25B

MC GOHAN
MODEL MG-25B

TRADE NAME	McGohan Model MG-25B
MANUFACTURER	Don McGohan , Inc., 3700 W. Roosevelt Rd., Chicago 24, Ill.
TYPE SET	AC Operated 4 Channel Audio Amplifier
TUBES (Six)	Types 6SC7 Preamp., 6SJ7 AF Amp., 6SN7GT AF Amp.-Phase Inverter, (2) 6L6GT Output, 5V4G Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles RATING .98 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

MC GOHAN MODEL MG-25B

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		McGohan PART No.	STANDARD REPLACEMENT		
V1	Preamplifier	6SC7	6SC7	8S	
V2	AF Amplifier	6SJ7	6SJ7	8N	
V3	AF Amp.-Phase Inverter	6SN7GT	6SN7GT	8BD	
V4	Audio Output	6L6G	6L6G	7S	
V5	Audio Output	6L6G	6L6G	7S	
V6	Rectifier	5V4G	5V4G	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	McGohan PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲20	475					TM-D20-450	D-260	
B	■20	475							
C2A	▲10	475				FP258	TM-D10-500	T-185	
B	■10	475							
C3	10	150				TC42	TD-10-150	FM-1512	Note 1
C4	10000			DD-103	811-01	DC-511			
C5	10000			DD-103	811-01	DC-511			
C6	.02	600		DF-203	817-02	PT612	IMP6-S2	330612	
C7	.02	600		DF-203	817-02	PT612	IMP6-S2	330612	
C8	10000			DD-103	811-01	DC-511			
C9	.1	600		DF-104		PT601	IMP6-P1	330601	
C10	.05	600		DF-503		PT615	IMP6-S5	330615	
C11	500	500		D6-501	GP2K-501	MC245		K-1350	
C12	500	500		D6-501	GP2K-501	MC245		K-1350	Note 2
C13	5000			DD-502	811-005	UC-525			
C14	3000				GP2-333-302	MC461		C-1230	
C15	.05	600		DF-503		PT615	IMP6-S5	330615	
C16	.05	600		DF-503		PT615	IMP6-S5	330615	

Note 1. Some versions may use a 20MFD capacitor in this application.
Note 2. Some versions may use a .01MFD capacitor in this application.

CONTROLS

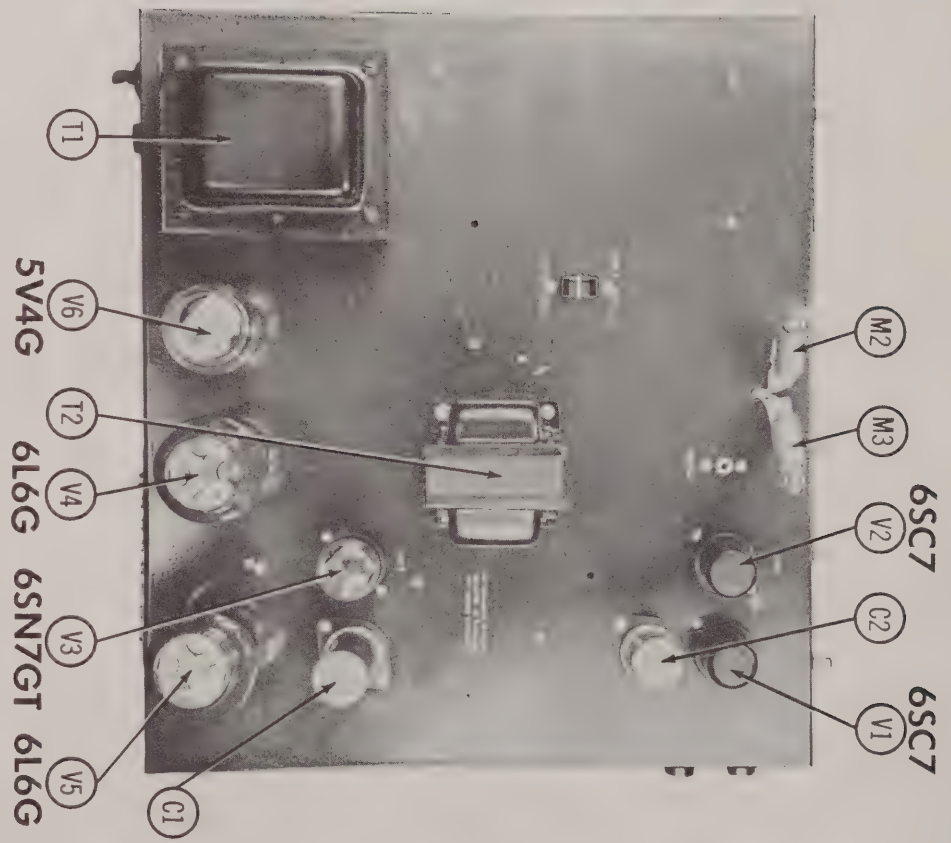
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	McGohan PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	BA011-301	Q13-133	A47-500K-Z	B-60	U-48	Mic #1
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R1A
R2A	500KΩ	½	BA011-301	Q13-133	A47-500K-Z	B-60	U-48	Mic #2
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	BA011-301	Q13-133	A47-500K-Z	B-60	U-48	Phono
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R3A
R4A	500KΩ	½	BA011-301	Q13-133	A47-500K-Z	B-60	U-48	Treble
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R4A
R5A	500KΩ	½	BA011-301	Q13-133	A47-500K-Z	B-60	U-48	Bass
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R5A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Mc Gohan PART No.	IRC PART No.	
R6	10Meg	½		BTS-10Meg	
R7	470KΩ	½		BTS-470K	
R8	10Meg	1		BTS-10Meg	
R9	470KΩ	1		BTS-470K	
R10	470KΩ	½		BTS-470K	Note 1
R11	470KΩ	½		BTS-470K	Note 1
R12	470KΩ	½		BTS-470K	Note 1
R13	10Meg	½		BTS-10Meg	
R14	470KΩ	½		BTS-470K	
R15	100KΩ	½		BTS-100K	
R16	470KΩ	½		BTS-47K	
R17	270KΩ	½		BTS-270K	
R18	27KΩ	½		BTS-27K	
R19	1500Ω	½		BTS-1500	
R20	100KΩ	½		BTS-100K	
R21	100KΩ	½		BTS-100K	
R22	100KΩ	½		BTS-100K	
R23	12KΩ	½		BTS-12K	Note 2
R24	180KΩ	½		BTS-180K	
R25	200Ω	10		1 3/4A-200	
R26	180KΩ	½		BTS-180K	
R27	10KΩ	2		BTB-10K	

Note 1. Some versions use a 270KΩ resistor in this application.
Note 2. Some versions use a 22KΩ resistor in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	McGohan PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.98A	744VCT .130ADC	5VAC @ 3A	6.3VCT @3.3A		P-2954 ①	PM-8411 ②	R-18B ②	P9317 ②	24R06 ②

① Drill new mounting holes.
② File mounting holes if necessary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	McGohan PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	6.2KΩ CT	500Ω tap @ 16Ω, 8Ω 4Ω, 2.7Ω, 2Ω			A-3028 ① ②			22S68 ③	① Drill new mounting holes. ② No 2.7Ω secondary tap. ③ Trans. sec. imp. 3.2, 4-6, 8-15, 250 and 500

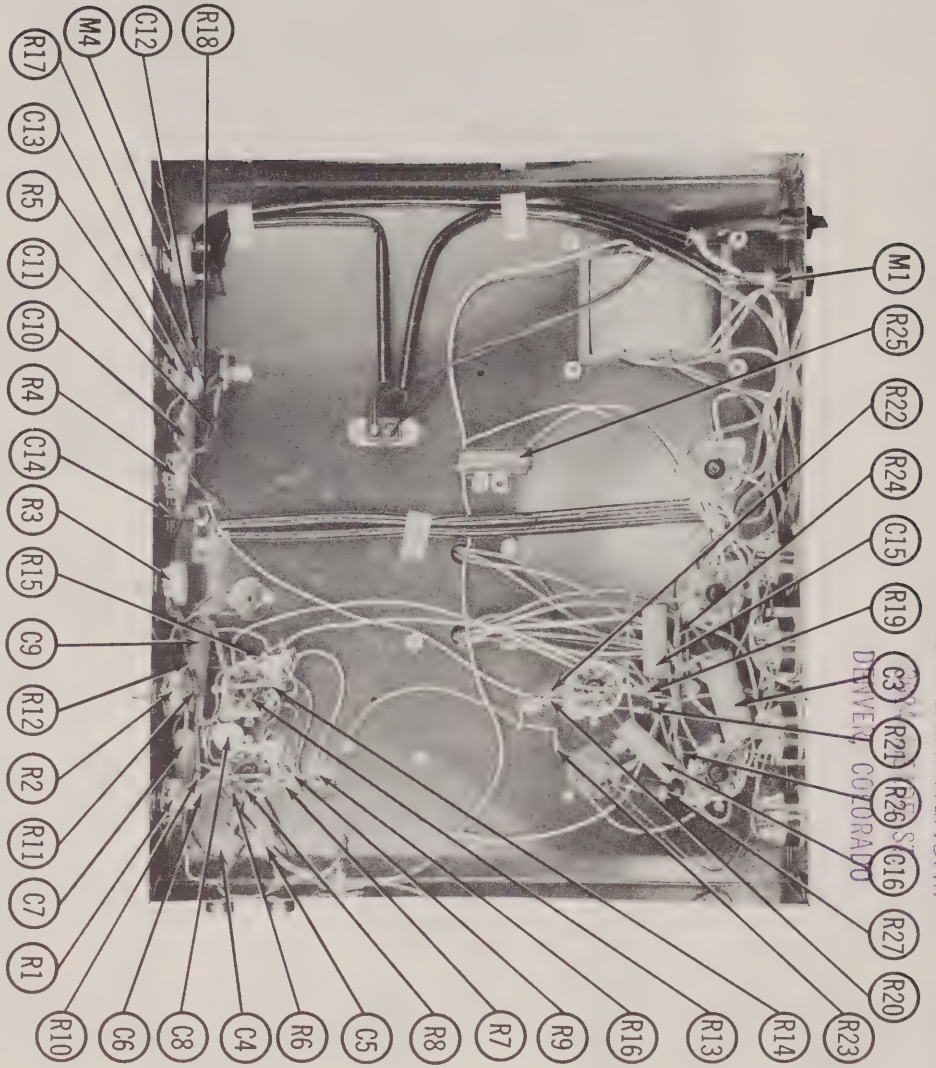
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			McGohan PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V			312002 (3AG-2A)	342001	AGC2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	McGohan PART No.	NOTES
M2	Pilot Light		#47, Bayonet
M3	Pilot Light		#47, Bayonet
M4	Switch		Power on-off

CHASSIS—BOTTOM VIEW



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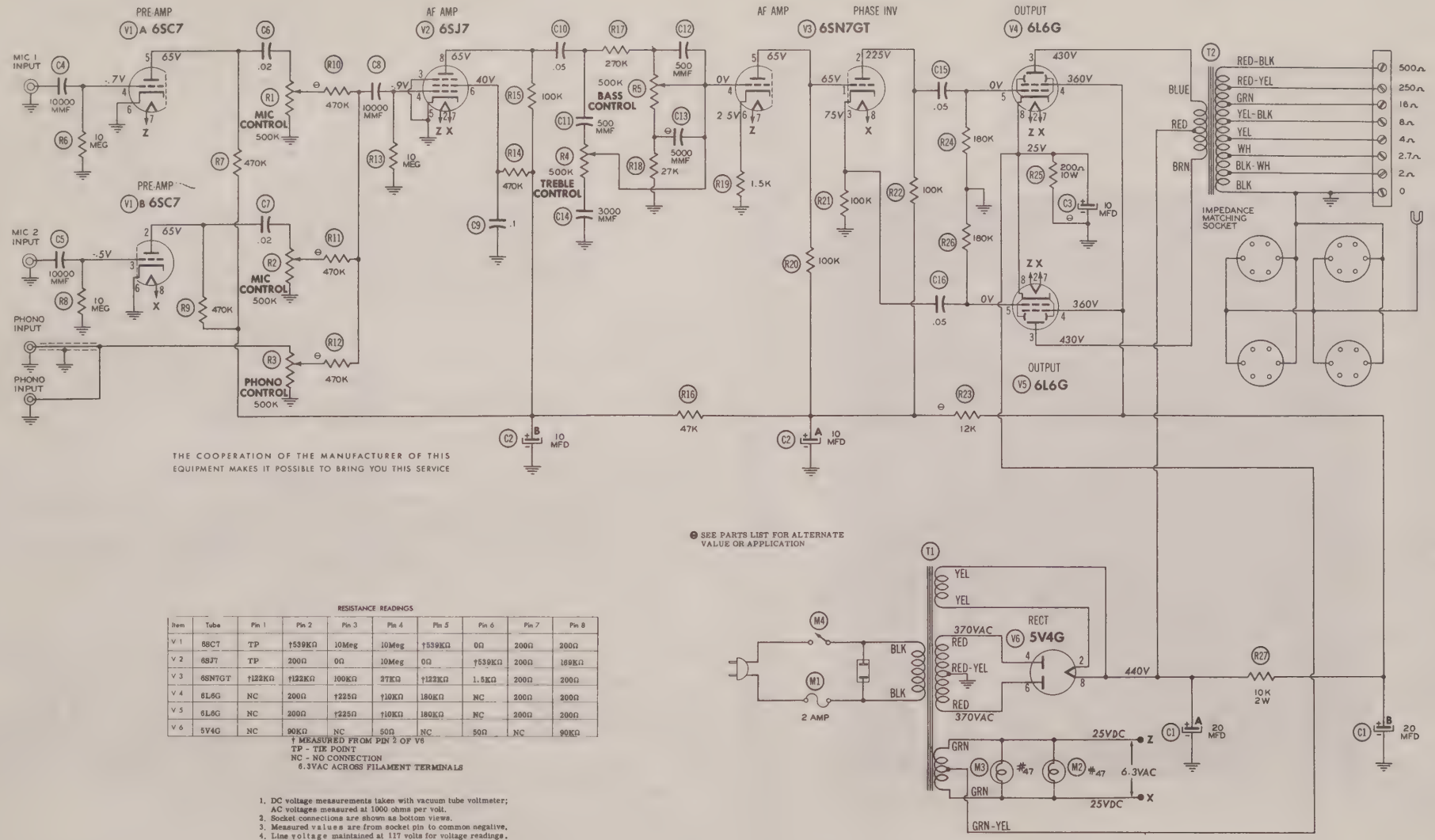
MC GOHAN
MODEL MG-25B

SET 280 FOLDER 6

MC GOHAN
MODEL MG-25B



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SC7	TP	†539KΩ	10Meg	10Meg	†539KΩ	0Ω	200Ω	200Ω
V 2	6SJ7	TP	200Ω	0Ω	10Meg	0Ω	†539KΩ	200Ω	169KΩ
V 3	6SN7GT	†122KΩ	†122KΩ	100KΩ	27KΩ	†122KΩ	1.5KΩ	200Ω	200Ω
V 4	6L6G	NC	200Ω	†225Ω	†10KΩ	180KΩ	NC	200Ω	200Ω
V 5	6L6G	NC	200Ω	†225Ω	†10KΩ	180KΩ	NC	200Ω	200Ω
V 6	5V4G	NC	90KΩ	NC	50Ω	NC	50Ω	NC	90KΩ

† MEASURED FROM PIN 2 OF V6
TP - TIE POINT
NC - NO CONNECTION
6.3VAC ACROSS FILAMENT TERMINALS

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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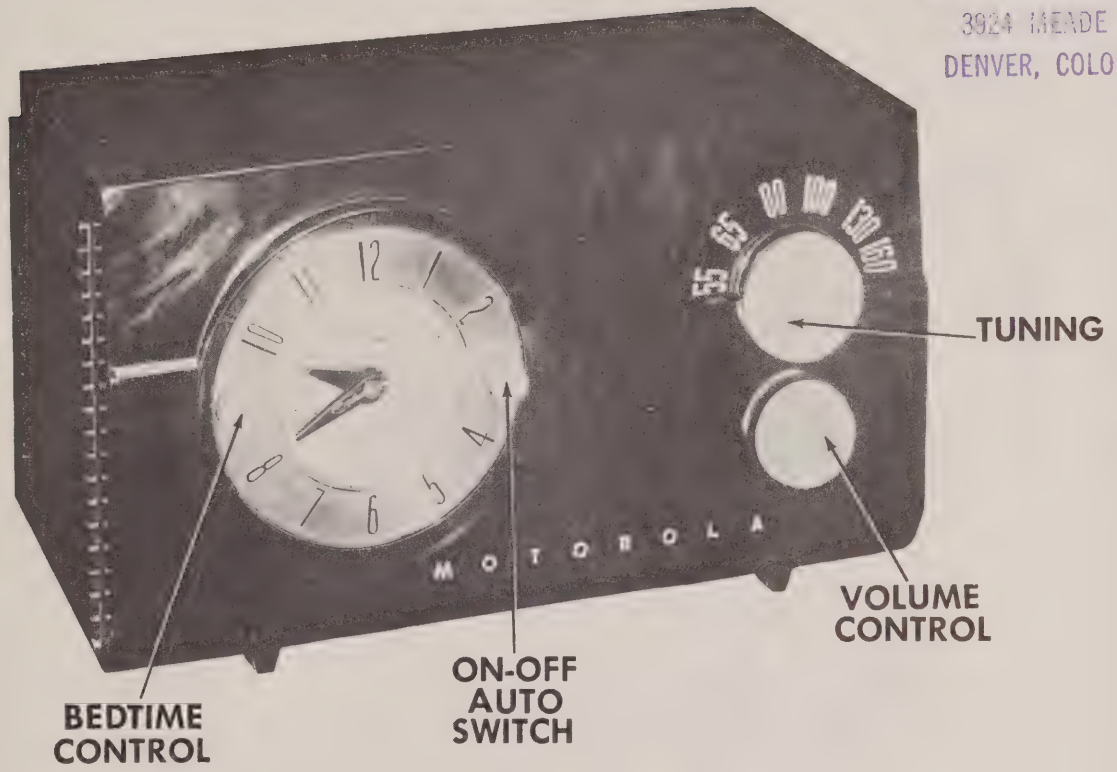
MOTOROLA MODELS
55C1, 55C2, 55C3, 55C4 (Ch. HS-456)



MOTOROLA MODELS
55C1, 55C2, 55C3, 55C4 (Ch. HS-456)

TRADE NAME	Motorola Models 55C1, 55C2, 55C3, 55C4 (Ch. HS-456)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS (Continued)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	50	150	23B630155			FP213	TM-5030-150	D-065	
B	30	150							
C2	.05	200	8A120842					360003	
C3A	220								
B	5000								
C	5000		♦21B630180						
D	250								
E									
C4	10000		21R120853	DD-103	811-01	DC-511			
C5	.047	400	8K490232			PT4147	IMP4-S47	3304147	

♦ Items C3A, C3B, C3C, C3D, C3E, R6A, R6B and R6C are combined in one ♦ unit. When replacing separately C3D and C3E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	18A630279	Q13-137	A47-1Meg-Z		U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3		Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22KΩ	½	6K119405	BTS-22K	
R3	3.3Meg	½	6K119407	BTS-3.3Meg	
R4	100Ω	½	6K119402	BTS-100	
R5	3.3Meg	½	6K119407	BTS-3.3Meg	
R6A	6.8Meg	½	♦21B630180	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	

♦ Items R6A, R6B, R6C, C3A, C3B, C3C, C3D and C3E are combined in one unit.

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7	150Ω	½	6K119403	BTS-150	
R8	1000Ω	2	6K121276	BTB-1000	
R9	27Ω	½	6B119401	BTS-27	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	3.2Ω	25B631459	A-3332	A-3025	S-12X	Z1101	26S58	

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	4"	PM	3.2Ω	50C631455 50C630287 ①	ST-113 Mod. P4-X	4A07	① Alternate speaker

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: MEISSNER PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: MILLER PART No.	NOTES
L1	Loop Ant.	3.1Ω		1V632714				Includes cabinet back
L2	Osc. Coil	.9Ω	10.5Ω	24B630327	14-1073		69-OSC *	
L3	Input IF	13Ω		24K632782	16-6770	BC-355	12-C6	
L4	Output IF	14Ω	14Ω	24K632039	16-6758	BC-353	13-PC2	

* Use connecting wires as mounting support.

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning Cap.	19K630263	2 Gang (28-387MMF, 15-120MMF)
M2	Clock	72D632676	
	Cabinet	16K632657	Model 55C1
	Cabinet	16K632659	Model 55C2
	Cabinet	16K632660	Model 55C3
	Cabinet	16K632661	Model 55C4
	Knob	36K632662	Control (Clock) 2 used - Models 55C1, 55C3, 55C4
	Knob	36K632663	Control (Clock) 2 used - Model 55C2
	Knob	36K632667	Tuning - Models 55C1, 55C3, 55C4
	Knob	36K632668	Tuning - Model 55C2
	Knob	36K632665	Volume - Models 55C1, 55C3, 55C4
	Knob	36K632666	Volume - Model 55C2
	Scale	34K632664	Clock Dial

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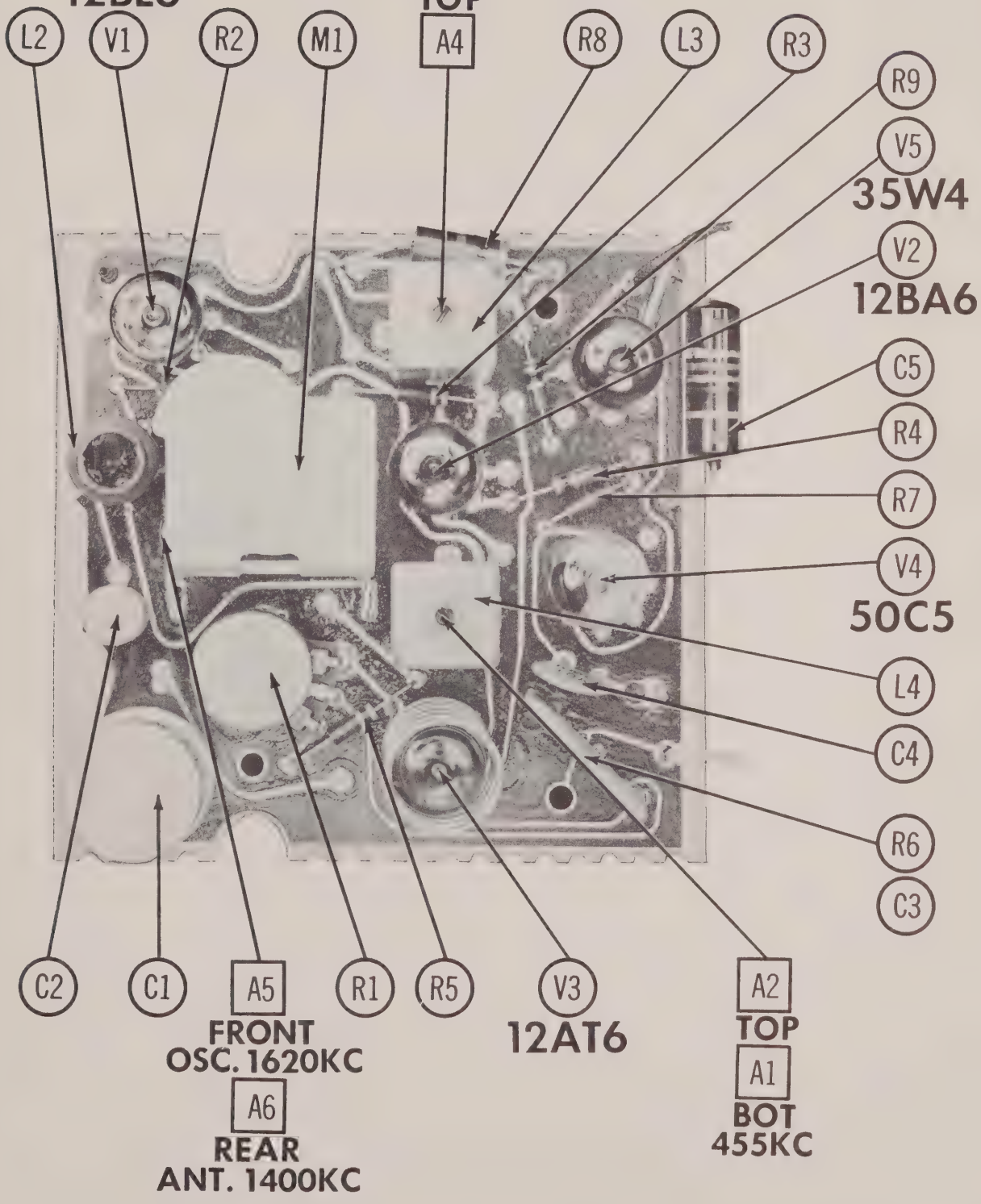
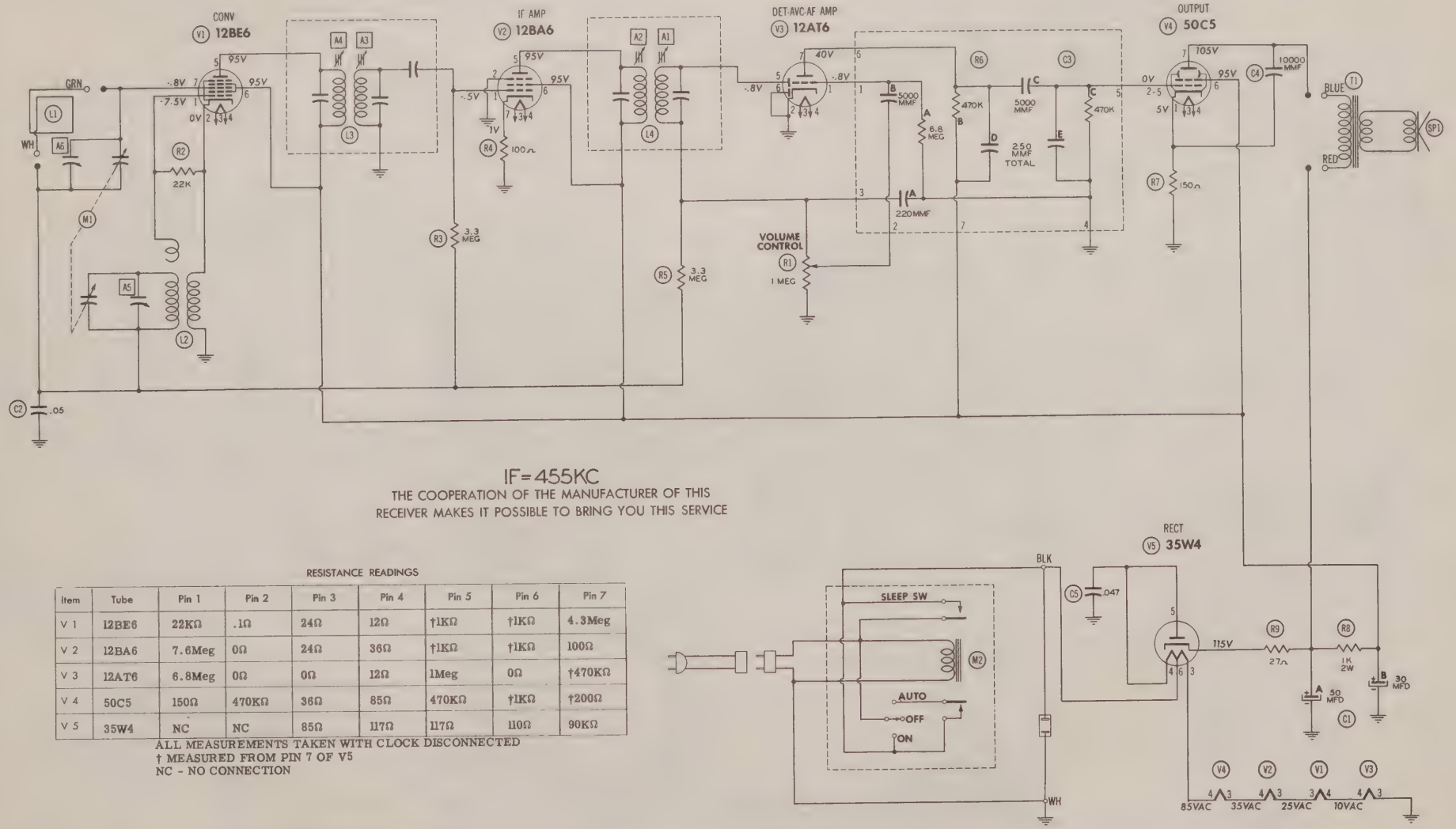


CHASSIS TOP VIEW



IF=455KC

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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.1Ω	24Ω	12Ω	†1KΩ	†1KΩ	4.3Meg
V 2	12BA6	7.6Meg	0Ω	24Ω	36Ω	†1KΩ	†1KΩ	100Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	12Ω	1Meg	0Ω	†470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	85Ω	470KΩ	†1KΩ	†200Ω
V 5	35W4	NC	NC	85Ω	117Ω	117Ω	110Ω	90KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED
† MEASURED FROM PIN 7 OF V5
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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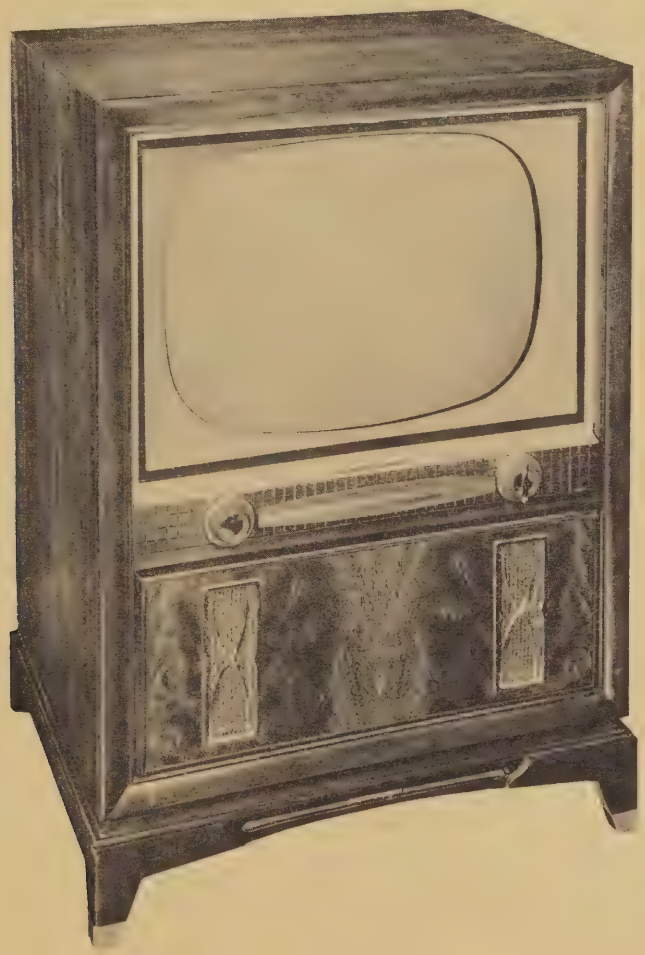

MODEL 22C4128M

PHILCO MODELS 22C4020,
22C4128M, 22C4132L (Ch. TV400)

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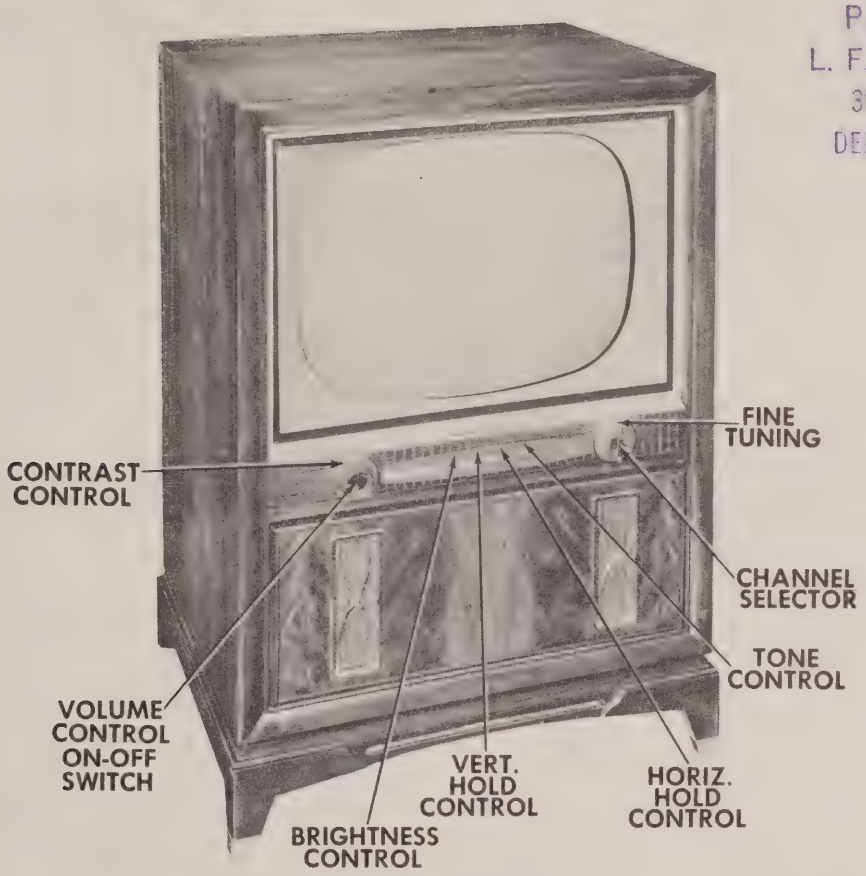

PHILCO MODEL 22C4128M

TRADE NAME	Philco Models 22C4020, 22C4128M, 22C4132L (Ch. TV400)
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Television Receiver
TUBES	Twenty-five
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.82 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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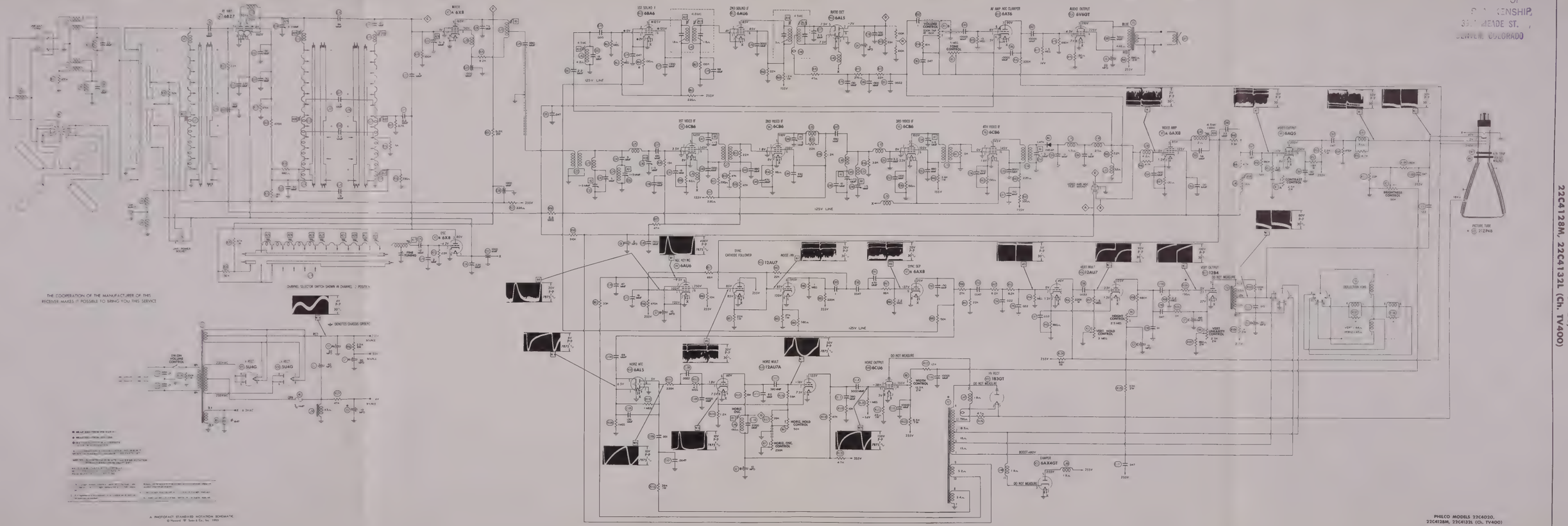
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CHASSIS TOP VIEW

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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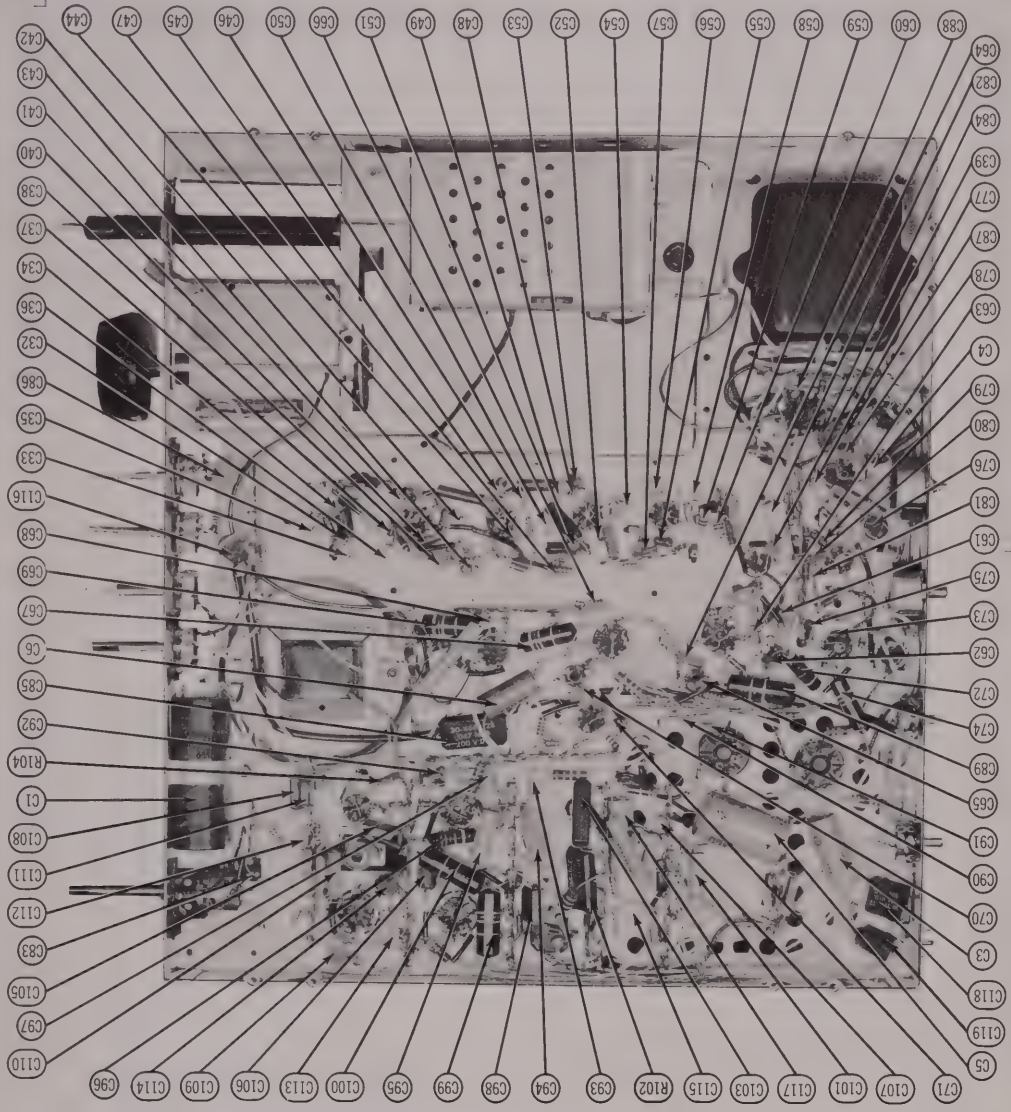

TUBE PLACEMENT CHART

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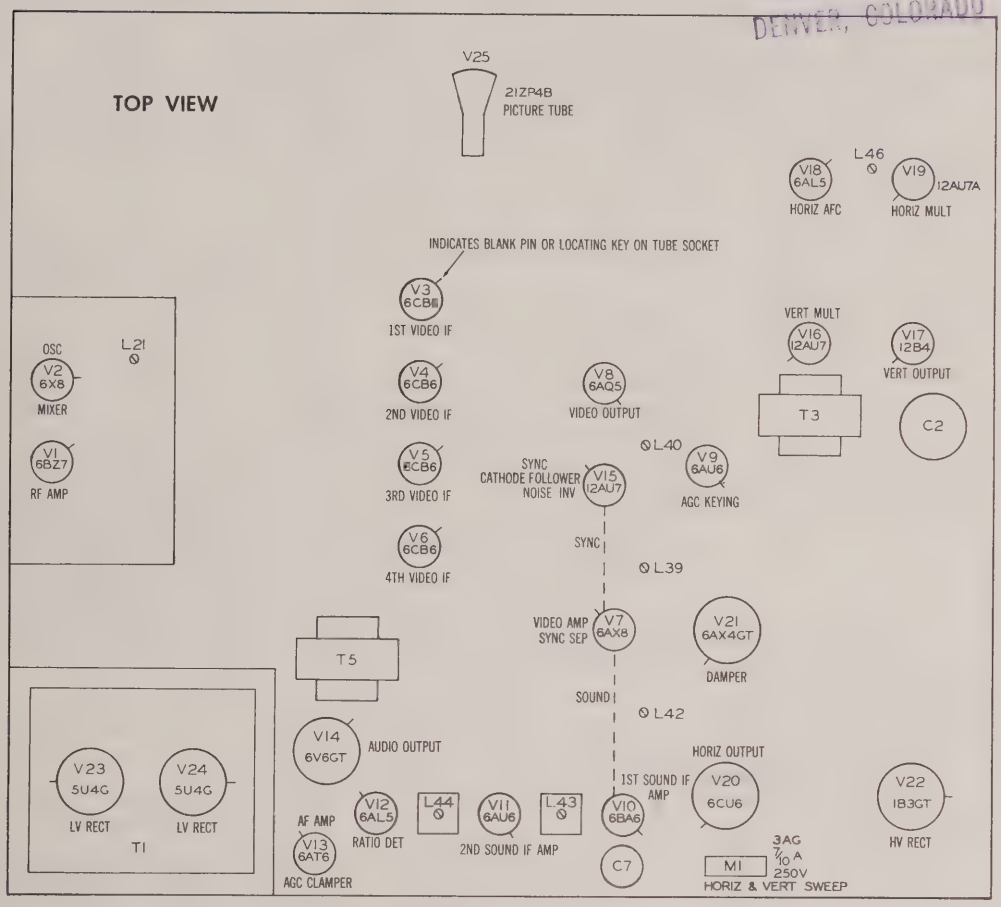

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V23, V24, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V8, V9, V25
Has pic, no sound - V10, V11, V12, V13, V14
Overloaded picture - V9, V13

SYNC FAILURE
No vert. sync - V7, V16
No horiz. sync - V7, V18, V19
No vert. or horiz. sync - V7, V15

SWEEP FAILURE
No raster, has sound - V19, V20, V21, V22, V25
No vertical deflection - V16, V17
Poor vert. linearity or foldover - V16, V17
Poor horiz. linearity or foldover - V19, V20, V21
Narrow picture - V19, V20, V21, V22, V23, V24
Vert. off freq. - V7, V16
Horiz. off freq. - V7, V18, V19

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Connect the deflection yoke and speaker during alignment.
Do not remove the horizontal oscillator tube (V19) to disable the high voltage.
The high voltage lead should be taped and kept away from chassis. IF shield should be in place.

VIDEO IF ALIGNMENT

Set the contrast and brightness control fully counter clockwise.
Connect the negative lead of a 10 volt bias supply thru a 10KΩ resistor to Ⓐ . Positive side to chassis.
Attenuate generator during alignment for 4 volts peak to peak at point Ⓑ .
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	Marker to point Ⓒ . Low side to chassis.	Not used	47.25MC (400∿ 30% Mod)	4	Vert. Amp. thru 15KΩ to point Ⓑ . Low side to chassis.	A1, A2	Adjust for MINIMUM 400∿ indication on scope.
2.	"	"	"	41.25MC	"	"	A3	"
3.	"	"	"	39.75MC	"	"	A4	"
4.	"	"	"	42.7MC	"	"	A5	Adjust for maximum 400∿ indication on scope.
5.	"	"	"	43.1MC	"	"	A6	"
6.	"	"	"	44.4MC	"	"	A7	"
7.	"	"	"	42.0MC	"	"	A8	"
8.	"	"	"	45.0MC	"	"	A9	"
9.	"	"	"	45.7MC	"	"	A10	"
10.	Fig. 1	Across antenna input thru matching network (Fig.1)	69MC (6MC Swp)	67.25MC 70.25MC	"	"		Set fine tuning control at is mid-range position. Check response curve (Fig.2) for curve limits. If necessary, retouch A5 thru A10. A5, A6 and A9 effect dip of response curve. Adjust A7 for proper tilt of the response. Adjust A8 for proper slope at low freq. side. Adjust A10 for proper level of response curve. Do not reset A1, A2 and A3.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove V3 from its socket.
Connect two matched 100KΩ (±1%) resistors in series from point Ⓓ to chassis. The junction of these two resistors is alignment point H as shown on the schematic.
Connect bias as in "Video IF Alignment" and adjust for -15 volts bias at point Ⓐ .
Volume control for normal volume.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	2200Ω Carbon Resistor	High side to point Ⓑ thru 2200Ω resistor. Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓓ Common to chassis.	A11, A12, A13, A14	Adjust for maximum deflection. Attenuate generator output to maintain not more than 5 volts on VTVM.
12.	"	"	"	"	DC probe to point Ⓔ . Common to point Ⓗ .	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V3 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove V3 from its socket.
Connect bias as in "Video IF Alignment" and adjust for -15 volts bias at point Ⓐ .
Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.
Volume control for normal volume.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	2200Ω Carbon Resistor	High side to point Ⓑ . Low side to chassis.	4.5KC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓓ . Low side to chassis.	A11, A12, A13, A14	Disconnect stabilizing capacitor (C4). Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
12.	"	"	"	"	"	Vert. Amp. to point Ⓔ . Low side to chassis.	A15	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 4. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines. Replace V3 in its socket.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
13.	2200Ω Carbon Resistor	High side to point Ⓑ . Low side to chassis.	4.5MC (Unmod)	Any	DC probe to pin 11 (cathode) of picture tube.	A16	Remove V3 from its socket. Adjust for MINIMUM deflection. Replace V3 in its socket.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in the strongest TV station available and adjust A16 for minimum 4.5MC beat interference in the picture with the fine tuning control in the center of its range.

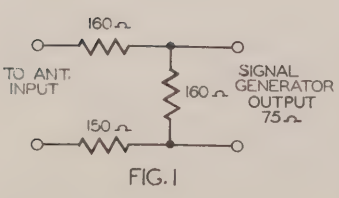

FIG. 1

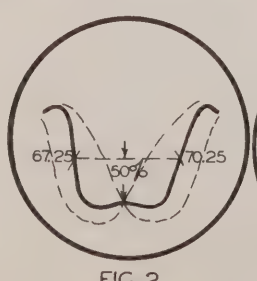

FIG. 2

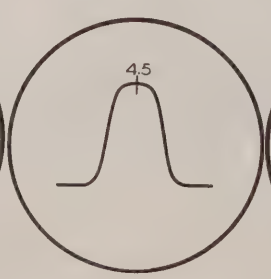

FIG. 3

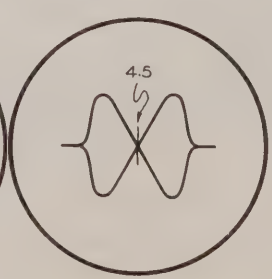

FIG. 4

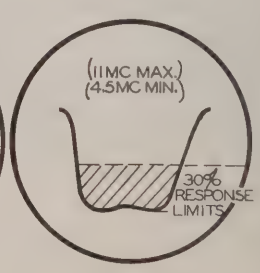

FIG. 5

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ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Disconnect white lead with pink tracer going to tuner AGC from main chassis.
Connect negative lead of a 1.5 volt battery to loose end. Positive lead to chassis.
Set fine tuning control at its mid-range position.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	Not used	257MC 251MC 245MC 239MC	13 12 11 10	Vert. Amp. thru 1KΩ to point Ⓒ. Low side to chassis.	A17 A18 A19 A20	Adjust for zero beat on scope. If regeneration occurs increase bias high as 3 volts if necessary.
15.	"	"	"	233MC 227MC	9 8	"	A21	Adjust A21 for channel 9 frequency. Then recheck A21 for channel 8 frequency. Recheck A21 for channel 9. If necessary make compromise between channel 8 and 9 for zero beat on scope.
16.	"	"	"	221MC	7	"	A22	Adjust A22 for zero beat on scope. Recheck steps 14, 15 and 16. If necessary, readjust until channels are within 500KC of their proper frequency.
17.	"	"	"	129MC	6	"	A23	Adjust for zero beat on scope.
18.	"	"	"	113MC	4	"	A24	"
19.	"	"	"	102MC	2	"	A25	"

RF AND MIXER ALIGNMENT

Connect bias as in oscillator alignment.
Disconnect tuner coupling link at the IF terminal strip near V3 and solder a 68Ω resistor to the open end of the lead from the tuner.
Remove V3 from its socket.
Adjust scope controls so that the width is double the height.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
20.	Fig. 1	Across antenna terminals thru (Fig.1) antenna matching network.	213MC (10MCSwp)	213MC 210MC 216MC	13	Vert. Amp. thru 10KΩ to point Ⓕ. Low side to chassis.	A26, A27	Check for response similar to Fig. 5. Use 210MC and 216MC markers to establish channel limits. If response is not flat between limits shown, detune A26 counter clockwise until single peak appears. Adjust A27 until peak falls on 213MC marker. Adjust A26 for response similar to Fig. 5.
21.	"	"	177MC (10MC Swp)	177MC 174MC 180MC	7	"	A28 A29	Check for response as indicated by dotted lines in Fig. 6A and 6B. Use 174MC and 180MC markers to establish channel limits. If necessary, adjust for mirror image of original response curve (tilt in opposite direction). If response curve appears as in Fig. 6A adjust A28 and A29 until curve appears as in Fig. 6B. This adjustment over compensates to allow for channel 13 adjustment. Repeat steps 20 and 21 until centered and symmetrical response curves are obtained on channel 7 and 13.
22.	"	"	85MC (10MC Swp)	85MC	6	"	A30, A31, A32	Adjust for symmetrical response approximately center bandpass. Adjust A31 counter clockwise until single peak appears. Adjust A30 until peak falls on 85MC marker. Adjust A32 for curve of maximum amplitude and symmetry of single peak. Retouch SLIGHTLY A30 and A31 if necessary, for symmetrical response centered at approximately the 85MC marker point (Fig. 5).
23.	"	"	44MC (10MC Swp)	44MC	UHF position	"	A33	Check response curve for symmetrical response centered at approximately 44MC. If necessary, adjust A33 for flat-topped symmetrical response centered at approximately the 44MC marker point. Repeat step 22 to be sure channel 6 (85MC) is within proper limits on response curve (Fig. 5).

VIDEO PEAKING COIL ADJUSTMENTS

In case of excessive overshoot or smear on some stations, it may be necessary to adjust A34. Alignment of the tuner and IF portions of the receiver must be correct before adjusting A34. Counter clockwise adjustment will reduce the amount of overshoot and clockwise adjustment will reduce the amount of smear. Proper adjustment point is the point of minimum smear and trailing whites. After A34 is adjusted, check all other stations to make certain they have not been seriously affected.

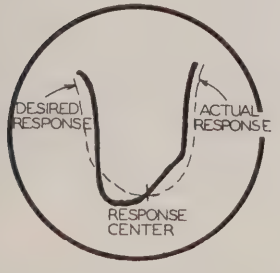


FIG. 6A

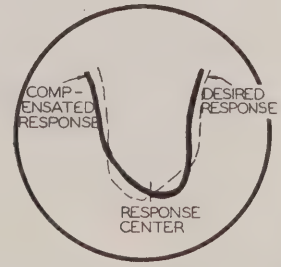
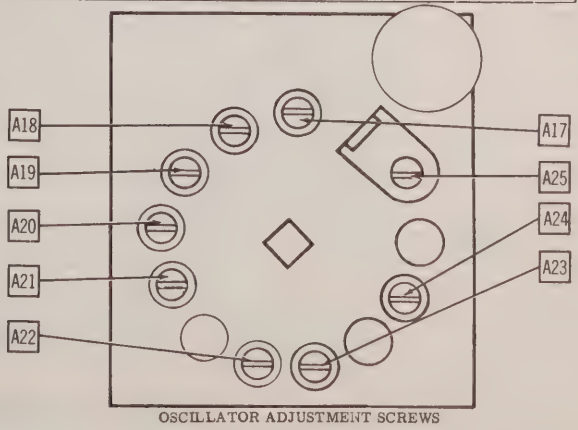


FIG. 6B

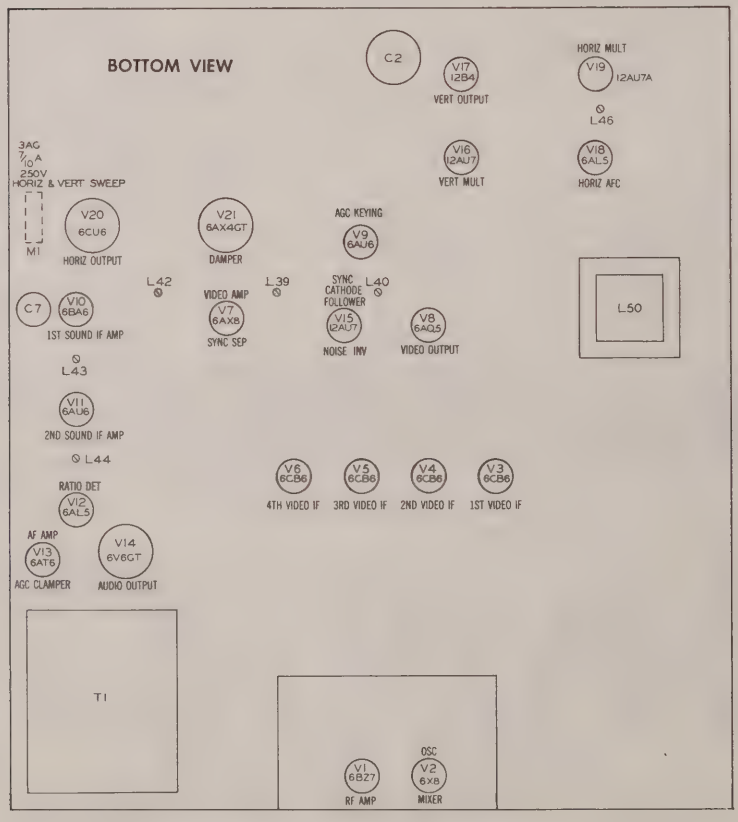


OSCILLATOR ADJUSTMENT SCREWS

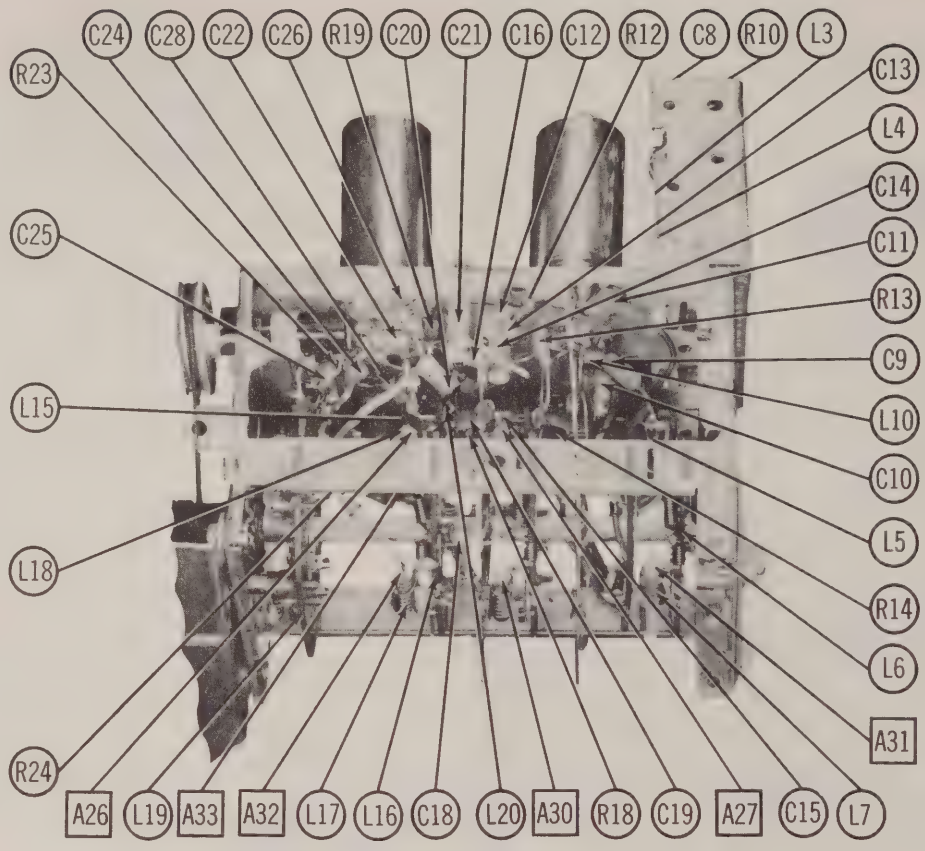
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†2KΩ	†230KΩ	INF	0Ω	.1Ω	INF	600KΩ	0Ω	0Ω
V 2	6X8	0Ω	22KΩ	†47KΩ	0Ω	.1Ω	0Ω	100KΩ	†16KΩ	†8.4KΩ
V 3	6CB6	100KΩ	82Ω	.1Ω	0Ω	†3KΩ	†3KΩ	0Ω		
V 4	6CB6	47KΩ	68Ω	.1Ω	0Ω	†3.9KΩ	†3KΩ	0Ω		
V 5	6CB6	3.9KΩ	150Ω	.1Ω	0Ω	†8KΩ	†8KΩ	0Ω		
V 6	6CB6	.2Ω	150Ω	.1Ω	0Ω	†3KΩ	†3KΩ	0Ω		
V 7	6AX8	■50KΩ	2.2KΩ	25KΩ	0Ω	.1Ω	■8KΩ	120Ω	0Ω	2.2Meg
V 8	6AQ5	600KΩ	500Ω	.1Ω	0Ω	†2.2KΩ	†1.8KΩ	600KΩ		
V 9	6AU6	90KΩ	25KΩ	.1Ω	0Ω	175KΩ	†10KΩ	25KΩ		
V 10	6BA6	500KΩ	■130Ω	.1Ω	0Ω	†220Ω	†220Ω	■130Ω		
V 11	6AU6	100KΩ	0Ω	.1Ω	0Ω	†14KΩ	†14KΩ	0Ω		
V 12	6AL5	0Ω	33KΩ	.1Ω	0Ω	INF	NC	INF		
V 13	6AT6	10Meg	0Ω	.1Ω	0Ω	NC	600KΩ	▲360KΩ		
V 14	6V6GT	TP	.1Ω	†1.2KΩ	†700Ω	500KΩ	20KΩ	0Ω	180Ω	
V 15	12AU7	†0Ω	■8KΩ	22KΩ	0Ω	0Ω	†180KΩ	22KΩ	27KΩ	.1Ω
V 16	12AU7	▲250KΩ	1Meg	680Ω	.1Ω	.1Ω	▲1.6Meg	3Meg	680Ω	0Ω
V 17	12B4	1KΩ	2.2Meg	.1Ω	0Ω	0Ω	TP	2.2Meg	NC	†1.3KΩ
V 18	6AL5	1Meg	2Meg	0Ω	.1Ω	1Meg	NC	0Ω		
V 19	12AU7A	†50KΩ	150KΩ	1.2KΩ	0Ω	0Ω	†20KΩ	7Meg	1.2KΩ	.1Ω
V 20	6CU6	NC	0Ω	TP	†12KΩ	1Meg	NC	.1Ω	22Ω	TOP CAP ▲22Ω
V 21	6AX4GT	NC	NC	130KΩ	NC	†2Ω	NC	.1Ω	0Ω	
V 22	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲770Ω
V 23	5U4G	INF	20KΩ	INF	50Ω	INF	50Ω	INF	20KΩ	
V 24	5U4G	INF	20KΩ	INF	50Ω	INF	50Ω	INF	20KΩ	
V 25	21ZP4B	0Ω	470KΩ	PIN 10 ▲33KΩ	PIN 11 †200KΩ	PIN 12 .1Ω				

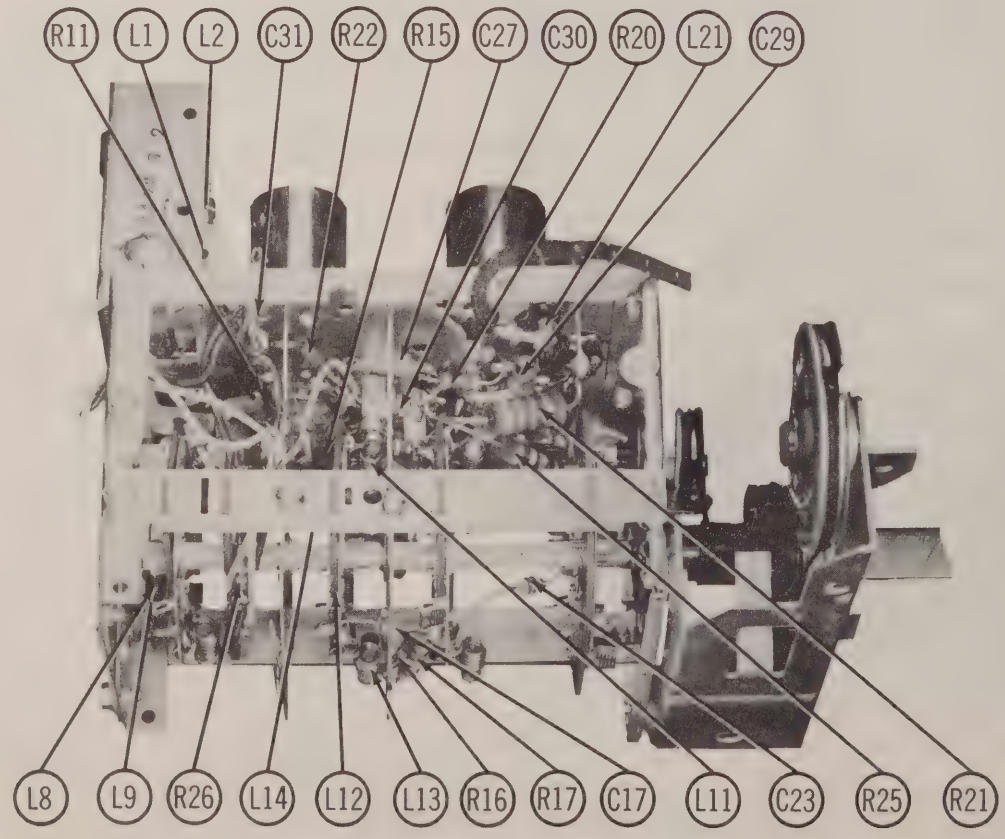
† MEASURED FROM RED LEAD OF POWER TRANSFORMER (T1).
■ MEASURED FROM 125V LINE
▲ MEASURED FROM PIN 3 OF V21
NC - NO CONNECTION
TP - TIE POINT
ALL MEASUREMENTS TAKEN WITH CHANNEL SELECTOR SWITCH IN "VHF" POSITION



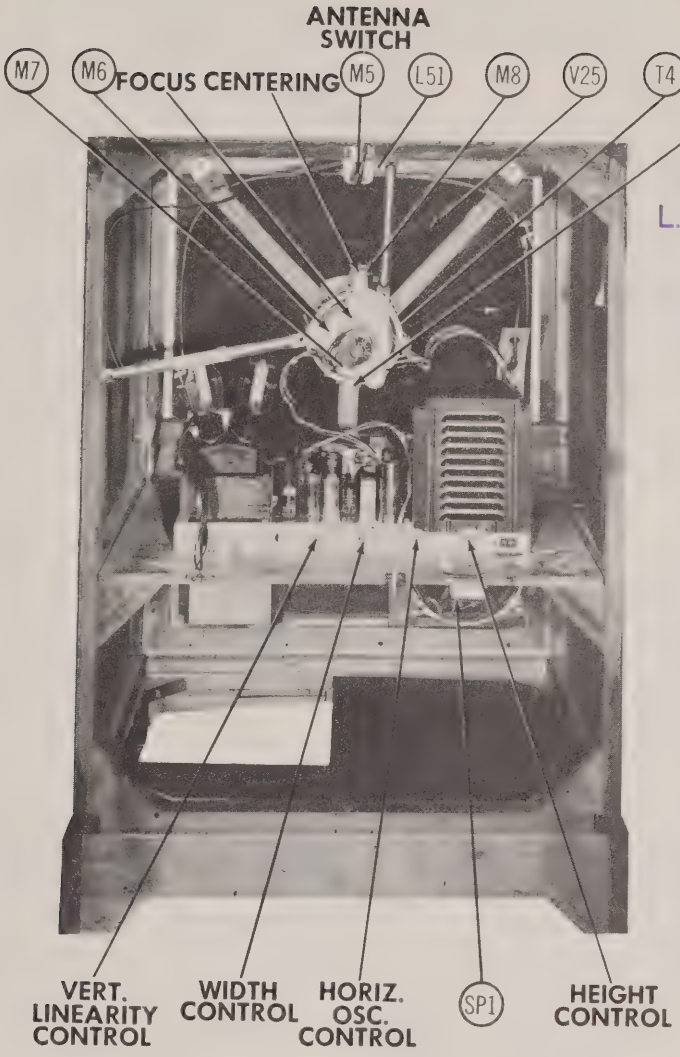
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



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3924 MEADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station, preferably a test pattern.

Reduce the picture width until approximately one inch of blank screen appears on each side of the picture.

Increase the brightness control setting until the blanking time becomes visible as indicated by a dark bar at each side of the picture.

Connect a .1MFD capacitor from point Ⓖ to chassis.

Set the horizontal hold control at the center of its range.

Adjust the horizontal oscillator control (R7) until the picture is centered between the two blanking bars.

Remove the .1MFD capacitor.

Adjust the horizontal oscillator coil slug (B1) until the picture is again centered between the two blanking bars.

Rotate the horizontal hold control thru its range. The picture should lose sync at both extremes of rotation.

If it does not readjust the horizontal oscillator control until that condition is obtained.

Check the number of diagonal bars on either side of the pull-in range of the horizontal hold control. There should be 1 or 2 bars present. If proper pull-in is not obtained, repeat the above procedure.

Adjust the horizontal width control (R8) for a picture slightly wider than necessary to fill picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V20, V21, V23 and V24. Check R123, R124, R8, R121, C114, T2, T4A and other associated components.

DRIVE LINES

Check by substitution V20 and V21. Check C114, R123, R124, T2 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V20 and V21. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V19, V20 and V21. Check C109 for open. Check L46, C108, C110, C104, R114 and other associated components.

XMAS TREE EFFECT

Check by substitution V19, V20 and V21. Check T2 and T4 for internal arcing. Check C106, C107, C110, C114, L46, R115, R118 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V16 and V17. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R104, R103, R102 and other associated components.	Check R96, R98, R6, C93, C96, C100, C97 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V16 and V17. Check height and vertical linearity controls for proper operation. Check R98, T3 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V16 and V17. Check R98, R6, R96, R125, R95, C96, C100 and other associated components.

COMPRESSED AT TOP

Check by substitution V16 and V17. Check R102, R9, C7C, C99, T3, T4B and other associated components.

FOLDS

Check by substitution V16 and V17. Check C98, C99, C100, R95, T3 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V15 and V7. Check R81, R82, R85, R89, C89, C90 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V16. Check vertical integrator network. Check R96, R95, R97, R3, C96, C97 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V18 and V19. Check horizontal AFC network. Check C108, C110, C112, R4, R115, R116, L46 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V15, V18 and V19. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check R48, R49, R53, R52, C66, C67, C69, C68 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A16. Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check contrast control. Check R47, R48, L41. L38, C64, C67, C69 and other associated components.

NEGATIVE PICTURE

Check by substitution V7 and V8. Check picture tube. Check video crystal detector network. Check C66, C67, C69, L36, L41, R48 and other associated components.

SMEAR

Check by substitution V7 and V8. Check L35, L36, L37, L38, L41, C66, C67, C69, R48, R47 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12, V13 and V14. Check stages V13 and V14 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C82, C84, C87, C88, C5, R76, R80, R79, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A15 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check M1 fuse. Check by substitution V23 and V24. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check by substitution V23 and V24. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Osc.-Mixer	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	4th. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amplifier-Sync Separator	6AX8	6AX8		
V8	Video Output	6AQ5	6AQ5	7BZ	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st. Sound IF Amp.	6BA6	6BA6	7BK	
V11	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V12	Ratio Detector	6AL5	6AL5	6BT	
V13	AF Amplifier-AGC Clamper	6AT6	6AT6	7BT	
V14	Audio Output	6V6GT	6V6GT	7S	
V15	Sync Cathode Follower-Noise Inverter	12AU7	12AU7	9A	
V16	Vert. Mult.	12AU7	12AU7	9A	
V17	Vert. Output	12B4	12B4	9AG	
V18	Horiz. AFC	6AL5	6AL5	6BT	
V19	Horiz. Mult.	12AU7A	12AU7A	9A	
V20	Horiz. Output	6CU6	6CU6	6AM	
V21	Damper	6AX4GT	6AX4GT	4CG	
V22	HV Rectifier	1B3GT	1B3GT	3C	
V23	LV Rectifier	5U4G	5U4G	5T	
V24	LV Rectifier	5U4G	5U4G	5T	

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3324 MEADE ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	PHILCO PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V25	21ZP4B ①	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A 21ZP4 ②	21ZP4B ① 21ZP4A	12N 12N 12D	① Aluminized ② Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	40	400	30-2568-62			FP146	TM-40-400	S-270	
C2A	■130	350	30-2584-49				TM-4122		
B	10	350							
C	▲10	475							
D	▲20	350							
C3	10	25	30-2417-1			TC22	TD-10-25	MT-0210	Note 1
C4	2	50	30-2417-7			TC302	TD-2-50		
C5	20	350	30-2417-44			TC65	TD-20-350	MT-4520	
C6	2	50	30-2417-7			TC302	TD-2-50		
C7A	■20	350	30-2584-43				TM-D20-350	T-700	
B	▲10	350					TD-100-50	MT-0550	
C	100	50							
C8	20		62-02030901l	TCZ-20	NP0K-200	ZT-542			
C9	33		62-03340901l	D6-330	GP1K-330	UC-5433			
C10	1000		30-1245-6						
C11	220		62-122001001	D6-221	GP2K-221	UC-5322			
C12	150		62-115001001	D6-151	GP2K-151	UC-5315			
C13	150		62-115001001	D6-151	GP2K-151	UC-5315			
C14	.5-3		31-6520-3	829-3	3115-01-0R5	CT565A			
C15	150			D6-151	811-151	UC-5315			
C16	.68		30-1224-126	TCZ-.68	NP0A-0R68				
C17	1.3								
C18	3.3			TCZ-3.3	NP0A-3R3	ZT-5533			
C19	15			D6-150	GP1K-150	UC-5415			
C20	27			TCZ-27					
C21	.5-3		31-6520-3	829-3	3115-01-0R5	CT565A			
C22	1.5								
C23	2.2		30-1224-127	TCZ-2.2	NP0A-2R2	ZT-5522			
C24	12		30-1224-128						
C25	12		30-1224-128						
C26	220		62-122001001	D6-221	GP2K-221	UC-5322			
C27	1000		30-1245-6						
C28	7.5		30-115001001						
C29	680		62-168001011	D6-681	GP2K-681	UC-5368			
C30	1000		30-1245-6						
C31	1000		30-1245-6						
C32	5		30-1224-28						
C33	1-5			829-6					
C34	8		30-1224-112						
C35	1-5			829-6					
C36	1-5			829-6					
C37	100		62-110001021	D6-101	GP1K-101	UC-531		K-1310	
C38	680		62-168001011	D6-681	GP2K-681	UC-5368		K-1368	
C39	1500		30-1238-15	DD-152	801-0015	DC-5215		C-1215	
C40	1500		62-215001011	D6-152	GP2L-152	UC-5215		C-1215	
C41	18			D6-180	GP1K-180	UC-5418		K-1418	
C42	1-5			829-6					
C43	680		62-168001011	D6-681	GP2K-681	UC-5368		K-1368	
C44	680		62-168001011	D6-681	GP2K-681	UC-5368		K-1368	
C45	470			D6-471	GP2K-471	UC-5347		K-1347	
C46	1-5			829-6					
C47	680		62-168001011	D6-681	GP2K-681	UC-5368		K-1368	
C48	10		62-010409001	D6-100	GP1K-100	UC-541		K-1410	
C49	1-7.5			829-7					
C50	1-5			829-6					
C51	3.3								
C52	680		62168001011	D6-681	GP2K-681	UC-5368		K-1368	
C53	1500		30-1238-15	DD-152	801-0015	DC-5215		C-1215	
C54	1-5			829-6					

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	PHILCO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C55	2000		30-1225-6	DE-202	GP2-333-202	UC-522		C-1220	
C56	1500		30-1238-15	DD-152	801-0015	DC-5218		C-1215	
C57	100		62-1200010Z1	DE-101	GPIK-101	UC-531		K-1310	
C58	1-5			538-5					
C59	10		62-0104090Z1	DE-100	GPIK-100	UC-541		K-1410	
C60	10		62-0104090Z1	DE-100	GPIK-100	UC-541		K-1410	
C61	2.2		30-1221-5	TCZ-2.2	NP0A-2R2	ZT-5522			
C62	18		62-0184090Z1	TCZ-18	NP0K-180	ZT-5518		KH-1418	
C63	100		62-1000010Z1	DE-101	GPIK-101	UC-531		K-1310	
C64	1500		62-1159010Z1	DE-152	GP2L-152	UC-5215		K-1415	
C65	56		62-0564090Z1	DE-560	GPIK-560	UC-5456		K-1456	
C66	33		62-0330090Z1	DE-330	GPIK-330	UC-5433		K-1433	
C67	.047	400	30-4650-45	DF-503		PT4147	IMP4-847	3304147	
C68	100		62-1200010Z1	DE-101	GPIK-101	UC-531		K-1310	
C69	.047	400	30-4650-45	DF-503		PT4147	IMP4-847	3304147	
C70	47		53-0470090Z1	DE-470	GPIK-470	UC-5447		K-1468	
C71	18			DE-180	GPIK-180	UC-5418		K-1418	
C72	.0015	400	30-1238-15	DE-152	GP2L-152	PT5215	IMP6-D15	3306215	
C73	1500		30-1238-15	DD-152	801-0015	DC-5215		C-1215	
C74	.047	200	30-4650-45	DF-503		PT4147	IMP4-847	3304147	
C75	68		62-0684090Z1	DE-680	GPIK-680	UC-5468		K-1468	
C76	5000		30-1238-1	DD-502	811-005	DC-525		C-1250	
C77	3.3			TCZ-3.3	NP0A-3R3	ZT-5333			
C78	330		62-1330010Z1	DE-331	GP2K-331	UC-5333		K-1333	
C79	150		62-1150010Z1	DE-151	GP2K-151	UC-5315		K-1315	
C80	1500		30-1238-15	DD-152	801-0015	DC-5215		K-1215	
C81	.0022	200		D6-222	GP3-333-222	PT6222	IMP6-D22	3306222	
C82	.1	100	30-4650-47	DF-104		PT401	IMP2-P1	330201	
C83	.047	200		DF-503		PT4147	IMP2-847	3302147	
C84	10000		30-1238-2	DD-103	811-01	DC-511	IMP6-S1	330611	
C85	.047	200	30-4650-45	DF-503		PT4147	IMP2-847	3302147	
C86	10000		30-1238-2	DD-103	811-01	DC-511	IMP6-S1	330611	
C87	10000		30-1238-2	DD-103	811-01	DC-511	IMP6-S1	330611	
C88	5000	1000	30-1253-1						
C89	.1	400	30-4650-47	DF-104		PT401	IMP4-P1	330401	
C90	.0047	400	30-4650-58	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C91	470		30-4650-25	D6-471	GP2K-471	PT5347		K-1347	
C92	150		62-1150010Z1	DE-151	GP2K-151	UC-5315		K-1315	
C93	.0047	400	30-4650-58	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C94	.025	200	30-4650-43	DF-203	817-02	PT4123	IMP4-823	3304123	
C95	.022	200	30-4650-43	DF-203	817-02	PT4123	IMP4-823	3304123	
C96	.0033	400	30-4650-55					330-1233	
C97	.0033	200	30-4650-44			PT6133	IMP6-S3	3306133	
C98	.01	400	30-4650-41	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C99	.047	600	30-4650-45	DF-503		PT6147	IMP6-D47	3306147	
C100	.1	400	30-4650-47	DF-104		PT401	IMP4-P1	330401	
C101	.015	400	30-4650-42			PT6115	IMP6-S15	3306115	
C102	.022	400	30-4650-43	DF-203	817-02	PT4123	IMP4-823	3304123	
C103	.047	400	30-4650-45	DF-503		PT4147	IMP4-847	3304147	
C104	68		53-0680090Z1	D6-680	GPIK-680	UC-5468		K-1468	
C105	120	500	60-10125337	D6-121	GP2K-121	UC-5312		K-1312	
C106	.001	400	30-4650-52	D6-102	GP2L-102	PT621	IMP6-D1	330621	
C107	.0047	400	30-4650-56	D6-472	CP2-333-472	PT6347	IMP6-D47	3306247	
C108	.0022	400	30-4650-54	D6-222	GP3-333-222	PT6222	IMP6-D22	3306223	
C109	10000		30-4650-53	DD-103	811-01	DC-511	IMP6-S1	330611	
C110	3200	500	60-20325434					CR-1223	
C111	82	500	60-00825437	TCZ-82	NP0L-820			KH-1482	
C112	390	500	60-10395437			MCB243		KH-1339	
C113	390	500	60-10395417			MCB243		KH-1339	
C114	5000		30-1238-1	DD-502	811-005	DC-525	IMP6-D5	C-1250	
C115	10000		30-1238-2	DD-103	811-01	DC-511	IMP6-S1	330611	
C116	10000		30-1238-2	DD-103	811-01	DC-511	IMP6-S1	330611	
C117	.047	600	30-4650-62	DF-503		PT6147	IMP6-847	3306147	
C118	.01	600	30-4650-58	D6-103	GP3-333-103	PT611	IMP6-S1	PC-0611	
C119	.01	600	30-4650-58	D6-103	GP3-333-103	PT611	IMP6-S1	PC-0611	

Note 1. Some versions use 25MFD in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2500Ω	2	33-5573-1	*Q7-940			WF252	Contrast
B	2500Ω	1					UB254-T755 †	Volume tapped at 150KΩ
C	Switch						UB-26	Attach to R1B
R2A	100KΩ	½	33-5572-9	Q11-128	A47-100K-S	B-40	U-41	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	3Meg	½	33-5572-14	Q11-160	A47-3Meg-S	B-94	U-99	Vert. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	50KΩ	½	33-5572-8	Q11-123	A47-50K-S	B-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	5Meg	½	33-5572-12	Q11-141	A47-5Meg-S	B-89	U-97	Tone
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R5A
R6A	2.5Meg	½	33-5572-1	Q11-230	A47-2.5Meg-S	BX-83	SU-250	Height
B	Shaft		Not Req.	RQ	FKS-1/4	Not Req.	Not Req.	Attach to R6A
R7A	250KΩ	½	33-5572	Q11-130	A47-250K-S	AB-46	SU-46	Horiz. Osc.
B	Shaft		Not Req.	RQ	FKS-1/4	AE-1	Not Req.	Attach to R7A
R8	12.5KΩ	2	33-5574	WK-12500			R10ML	Width (Wire wound)
R9A	2500Ω	2	33-5546-40	WK-2500	A43-2500	VK-132	R2500L	Vert. Linearity (Wire wound)
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R9A

* CONCENTRIKIT EQUIVALENT: KIT K-3, BASE ELEMENTS & SHAFTS: W11-111 & P3-129 (PANEL)
B12-120X & R1-216 (REAR)
76-1 SWITCH

† Universal replacement (Mallory exact duplicate part no. UE319WS)

RESISTORS

ITEM No.	RATING OHMS	RATING WATTS	PHILCO PART No.	IRC PART No.	NOTES
R10	4.2MΩ	1		BTS-47K	
R11	22KΩ	1		BTS-33K	
R12	470KΩ 5%	1		BTS-470K 5%	
R13	470KΩ 5%	1		BTS-470K 5%	
R14	680Ω	1		BTS-680	
R15	1900Ω	1		BTA-1800	
R16	1500Ω	1		BTS-1500	
R17	2700Ω	1		BTS-2700	
R18	330Ω	1		BTS-330	
R19	100KΩ	1		BTS-100K	
R20	8200Ω	1		BTS-8200	
R21	2200Ω	2		BTS-8200	
R22	220Ω	1		BTS-220	
R23	22KΩ	1		BTS-22K	
R24	150KΩ	1		BTS-150K	
R25	47KΩ	1		BTA-47K	
R26	150KΩ	1		BTS-150K	
R27	47KΩ	1	66-5478340	BTS-47K	
R28	15KΩ	1	66-5156340	BTS-15K	
R29	47KΩ	1	66-5478340	BTS-47K	
R30	82Ω	1	66-0828340	BTS-82	
R31	2200Ω	1	66-1228340	BTS-220	
R32	22KΩ	1	66-5228340	BTS-22K	
R33	47KΩ	1	66-5478340	BTS-47K	
R34	6800Ω	1	66-0868340	BTS-68	
R35	22KΩ	1	66-5228340	BTS-22K	
R36	1200Ω	1	66-5128340	BTS-1200	
R37	220Ω	1	66-1228340	BTS-220	
R38	3900Ω	1	66-2398340	BTS-3900	
R39	150Ω	1	66-1158340	BTS-150	
R40	5600Ω	1	66-2564340	BTA-5600	
R41	10KΩ	1	66-5108340	BTS-10K	
R42	150Ω	1	66-1158340	BTS-150	
R43	220Ω	1	66-1228340	BTS-220	
R44	330Ω	1	66-1338340	BTS-330	
R45	2200Ω	1	66-5228340	BTS-2200	
R46	4700Ω	1	66-5478340	BTS-4700	
R47	220Ω	1	66-1228340	BTS-220	
R48	3300Ω	1	66-5338340	BTS-3300	
R49	4700Ω	1	66-5478340	BTS-4700	
R50	680KΩ	1	66-6688340	BTS-680K	
R51	3.3Meg	1	66-5338340	BTS-3.3Meg	
R52	1800Ω	1	66-2184340	BTA-1800	
R53	2300Ω	7	33-1335-97		
R54	4700Ω	1	66-4478340	BTS-470K	
R55	4700Ω	1	66-2478340	BTS-4700	
R56	470KΩ	1	66-4478340	BTS-470K	
R57	68KΩ	1	66-6838340	BTS-68K	
R58	5.6Meg	1	66-5568340	BTS-5.6Meg	
R59	520KΩ 5%	1	66-4518340	BTS-510K 5%	
R60	10KΩ	1	66-5108340	BTS-10K	
R61	33KΩ	1	66-5338340	BTS-33K	
R62	1Meg ½%	1	66-5108340	BTS-1Meg 5%	
R63	1Meg ½%	1	66-5108340	BTS-1Meg 5%	
R64	150Ω 5%	1		BTS-130 5%	Note 1
R65	22KΩ	1	66-1228340	BTS-220	
R66	2500Ω	6	33-3435-38		
R67	100KΩ	1	66-4108340	BTS-100K	
R68	22KΩ	1	66-5228340	BTS-22K	
R69	12KΩ	1	66-5124340	BTA-12K	
R70	47Ω	1	66-0478340	BTS-47	

Note 1: Some versions may use a 100Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI	RATING SEC. 1	RATING SEC. 2	PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1.82A	530VCT @ 1.82A	5VCT @ 6A	32-8651						26R34 ①
		SEC. 3	SEC. 4	SEC. 5						
		6.3VAC ± 9 5A								

① Tape 6.3V @ 1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	PHILCO Part No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Bam PART No.	Stancor TYPE No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	32-8662-1							
		32-8663 ①							
T3	Vert. Output Trans.	32-8825-2					A-8149	26S7① ③	
T4A	Yoke-Horiz. (30MΩ)	32-9670 ④	DF-604 ⑤	MDF-71⑤		Y70F30①	DY-12A ⑤	Y-13②	Y-24 ⑤
B	Vert. (90MΩ)								

① Alternate horiz. output trans.
② Drill new mounting hole(s).
③ Connect as auto transformer.
④ Includes resistors R105 and R106.
⑤ Use original yoke damping network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	PHILCO PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No.	Thordarson PART No	NOTES
T5	5.1KΩ	3.5Ω	32-8685	A-3849	A-3019	S-5Z	Z-002	26S49	

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V	C	IMP	PHILCO PART No	JENSEN PART No	QUAM PART No	NOTES
SP1	8"	PM	3	5Ω		36-1651-11	ST-115 Mod. P8-V	8A21	

COILS (RF-IF)

ITEM No.	USE	DC RES PRI	DC RES SEC.	PHILCO PART No	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	VHF Ant. Matching Trans.	.7Ω	0Ω	32-4432-3				
L2	VHF Ant. Matching Trans.	.7Ω	0Ω	32-4432-3				
L3	IF Trap	0Ω		32-4550-3				Wound on 22MM7 Cap.
L4	FM Trap	0Ω						Channel 13
L5	VHF Ant. Coil	0Ω						
L6	VHF Ant. Coil	0Ω						Channel 6
L7	VHF Ant. Coil	0Ω						
L8	UHF IF Inter-stage Coil	0Ω		32-4623-55				
L9	UHF IF Inter-stage Coil	0Ω		32-4623-56				
L10	Neut. Coil	0Ω		32-4623-50				
L11	VHF RF Coil	0Ω						Channel 13
L12	VHF RF Coils	0Ω						
L13	VHF RF Coil	0Ω						Channel 6
L14	UHF Coil	0Ω						
L15	VHF Mixer Grid Coil	0Ω						Channel 13
L16	VHF Mixer Grid Coils	0Ω						
L17	VHF Mixer Grid Coil	0Ω						
L18	UHF Coil	0Ω						
L19	VHF Osc. Coil	0Ω						
L20	RF Choke	0Ω						
L21	Conv. Plate	0Ω	0Ω	32-4597-14				Tapped
L22	Video Coupling	.0Ω		32-4596-1				
L23	47.25MC Trap	.1Ω		32-4597-13	19-1001		6804	
L24	41.25MC Trap	.5Ω		32-4113-54	19-1003		6806	
L25	1st. Video IF	.1Ω		32-4597-5	19-1001	TV-189	6176	.84 Microhenry
L26	2nd. Video IF	.0Ω		32-4113-49	19-1003		6806	2 Microhenries
L27	3rd. Video IF	.1Ω	.1Ω	32-4480-6				
L28	4th. Video IF	.0Ω		32-4113-49	19-1003		6806	2 Microhenries
L29	3rd. Video IF Trap	.5Ω		32-4113-51	19-1003		6806	2.3 Microhenries
L30	47.25MC Trap	.1Ω		32-4597-15	19-1001		6804	1.5 Microhenries
L31	39.5MC Trap	.3Ω			19-1003		6806	2.5 Microhenries
L32	Video IF Coupling Coil	.3Ω	.3Ω	32-4548-13	19-3001	TV-188	6175	.94 Microhenry
L33	4th. Video IF	.1Ω	.3Ω	32-4598-6				
L34	5th. Video IF	.3Ω	.3Ω	32-4598-9				
L35	Series Peaking Coil	1.3Ω		32-4480-8	19-1008		6808	4 Microhenries
L36	Series Peaking Coil	2.7Ω		32-4113-52	19-1003		6806	3 Microhenries
L37	Shunt Peaking Coil	3.3Ω		32-4480-6	19-3128		6153	125 Microhenries
L38	Series Peaking Coil	4.2Ω			19-4201	TV-184	6180	180 Microhenries
L39	4.5MC Trap	3Ω		32-4483-13	20-1004	TV-151	3469	
L40	Adj. Shunt Peaking Coil	9Ω		32-4467-23				
L41	Series Peaking Coil	3.1Ω		32-4480-8	19-3125		6153	125 Microhenries
L42	1st. Sound IF	4.3Ω		32-4483-9	17-3400	TV-151	3469	
L43	2nd. Sound IF	1.9Ω	1.8Ω	32-4497A	18-3445	TV-113	6203	
L44	Ratio Det.	9Ω	.83CT	32-4480-8A	17-3497	TV-115	6205	Tertiary winding - 7Ω
L45	FIL. Choke	0Ω						3 Microhenries
L46	Horiz. Osc.	160Ω		32-4557-3				
L47	RF Choke	1.9Ω			19-1005		4613	11 Microhenries
L48	RF Choke	1.9Ω			19-1005		4613	11 Microhenries
L49	RF Choke	1.9Ω			19-1005		4613	11 Microhenries
L51	Sol. Loading Coil							

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 Cy.	PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L50	250ADC	43Ω	1.18HY	32-8654					

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

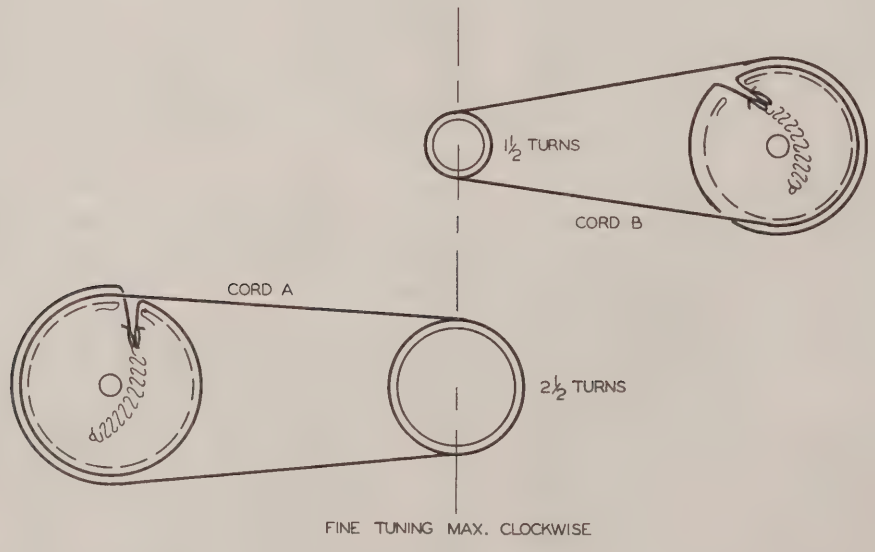
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PHILCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	7/10A 250V		76-4519-2	313. 750 (3AG-S/B-3/4A)	357001	MDL 7/10	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PHILCO PART No.	SYLVANIA PART No.		
M2	1N64P	34-8022	1N60 or 1N132		Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M3	Dial Light	3463-4	#1847, Bayonet
M4	Tuner	76-8946-3	
M5	Switch	42-1979	VHF Built-in Ant. Switching
M6	Focus Magnet	76-9014	Includes Centering Device
M7	Ion Trap	76-6077-2	
M8	Correction Magnet	76-6594	Includes Arm & Magnet (Top of Picture Tube)
M9A	Correction Magnet	76-8389	Short Arm (Bottom of Picture Tube) Models 22C4128 & 22C4020
B	Correction Magnet	76-8389-2	Short Arm (Bottom of Picture Tube) Model 22C4132L
	Cabinet	11081-1	Model 22C4132L
	Cabinet	11068	Model 22C4128
	Cabinet	11057-1	Model 22C4020
	Knob	76-7710	Built-in Ant. Switching
	Knob	54-6140-3	Brightness - Model 22C4132L
	Knob	54-6140-1	Brightness - Models 22C4128 & 22C4020
	Knob	76-9118-8	Channel Sel. - Model 22C4132L
	Knob	76-9118	Channel Sel. - Models 22C4128 & 22C4020
	Knob	76-6213-9	Contrast - Model 22C4132L
	Knob	76-6213-6	Contrast - Models 22C4128 & 22C4020
	Knob	76-6104-9	Fine Tuning - All Models
	Knob	54-6140-3	Horiz. Hold - Model 22C4132L
	Knob	54-6140-1	Horiz. Hold - Models 22C4128 & 22C4020
	Knob	54-6140-1	Tone - Models 22C4128 & 22C4020
	Knob	54-6140-3	Tone - Model 22C4132L
	Knob	54-6140-3	Vertical Hold - Model 22C4132L
	Knob	54-6140-1	Vertical Hold - Models 22C4128 & 22C4020
	Knob	54-6137	On-Off-Volume - Models 22C4128 & 22C4020
	Knob	54-6137-1	On-Off-Volume - Model 22C4132L
	Safety Glass	54-9213-43	Model 22C4132L
	Safety Glass	54-9213-37	Model 22C4128
	Safety Glass	54-9213-36	Model 22C4020
	Mask	28-9376-17	Model 22C4132L
	Mask	28-9376-12	Model 22C4128
	Mask	28-10075-1	Model 22C4020



DRIVE CORD STRINGING

TROUBLE SHOOTING AIDS (cont)

PERTY OF
BLANKENSHIP
3924 MEADE ST.
DENVER, CO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V19, V20, V21 and V22. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C117, C2C, R125, R124, R123, R121, R8 and other associated components.	Check L46, C110, C112, C114, C2B, R114, R115, R118 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V20, V21, V23 and V24. Check R123, R124, R121, C113, C114 and other associated components.

BLOOMING

Check by substitution V20, V21, V22, V23 and V24. Check R118, R123, R124, C114 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7, V8, V9 and V10. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

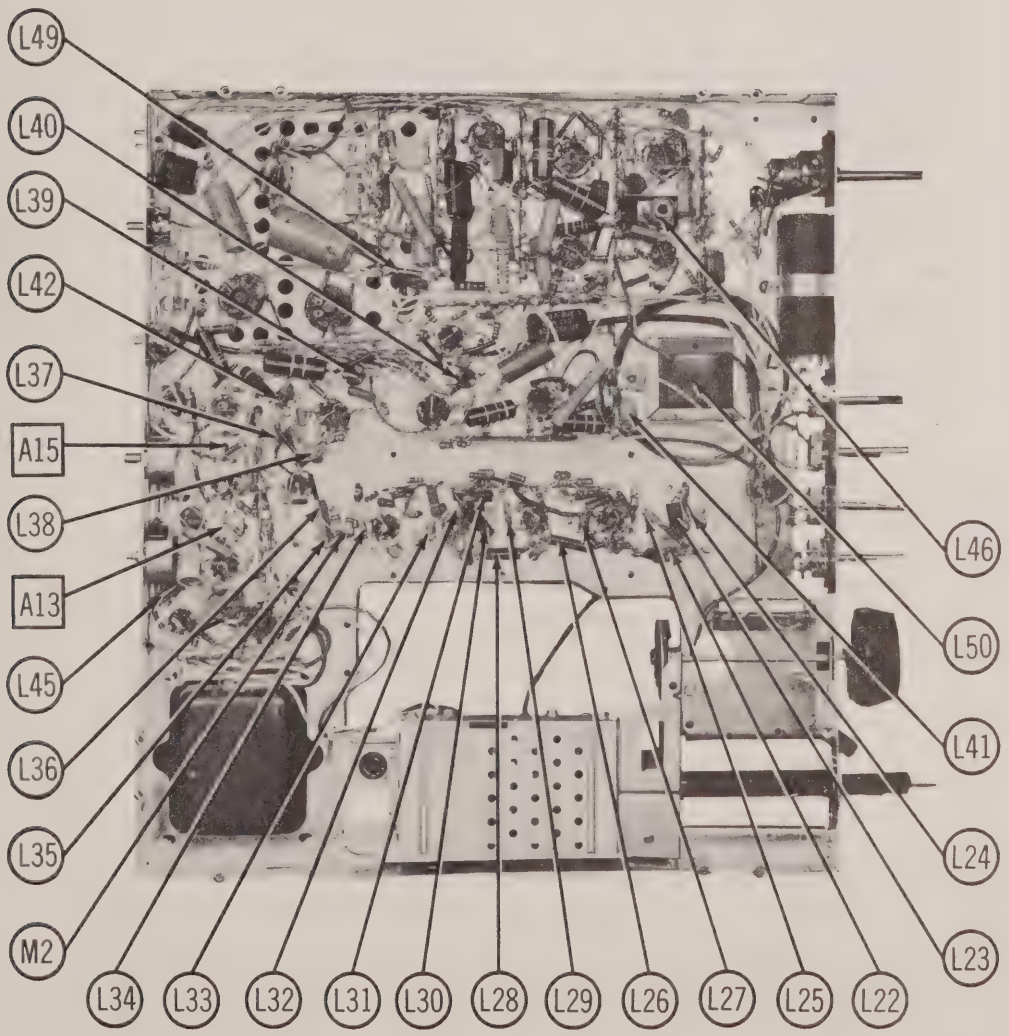
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

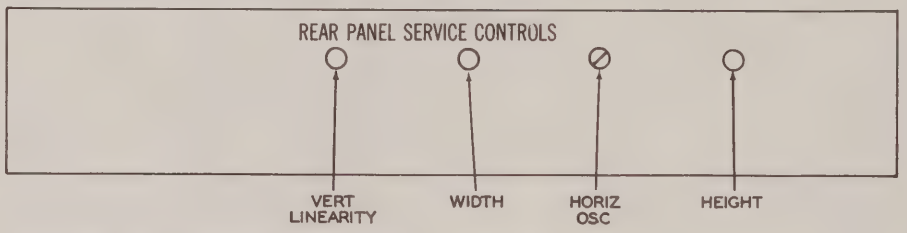
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding metal strip at the top of safety glass. Remove metal strip and safety glass. Use extreme catuion when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal oscillator control until picture synchronizes horizontally. If results are unsatisfactory refer to horizontal sweep circuit adjustment on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L44) located on top of chassis. (For location see tube placement chart).

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

BUILT-IN ANTENNA TUNING

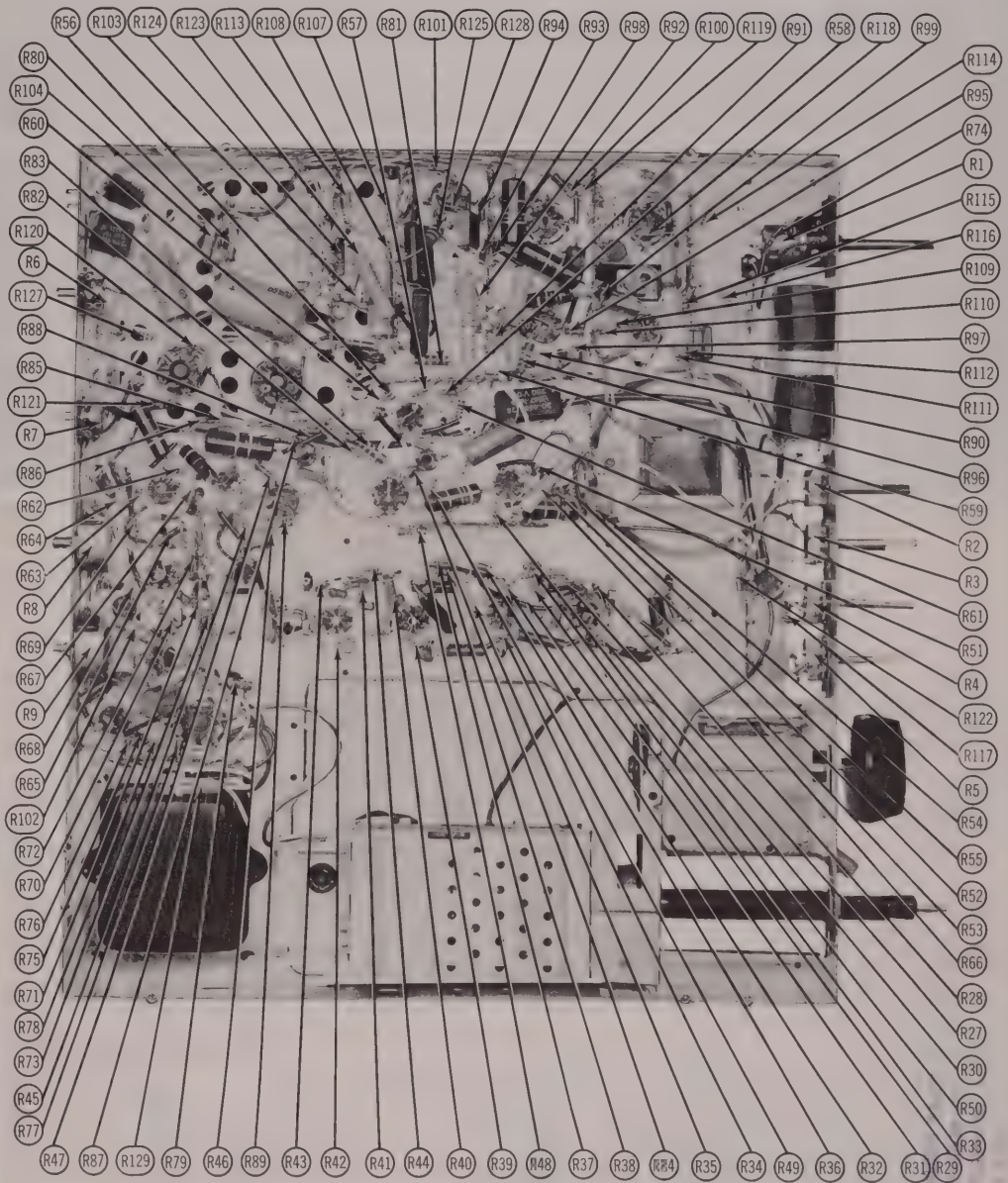
Built-in antenna can be adjusted from rear of the cabinet. Adjust for a picture of maximum contrast and minimum ghosts.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 2 metal screws holding front control panel. Remove panel and 4 small push-on type control knobs.
3. Remove 5 wood screws. Remove rear cover.
4. Disconnect yoke plug, HV lead and speaker leads.
5. Remove 5 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
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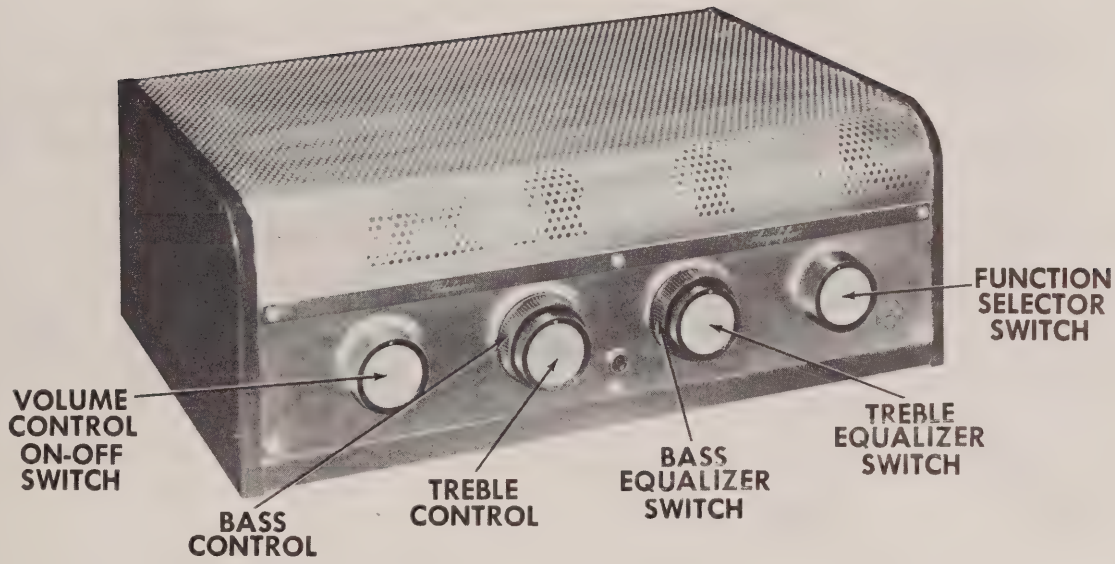
DENVER, COLORADO

PILOT
MODEL AA-420



PILOT
MODEL AA-420

TRADE NAME	Pilot Model AA-420
MANUFACTURER	Pilot Radio Corp., 37-06 36th St., Long Island City, N. Y.
TYPE SET	AC Operated 4 Channel 15 Watt Audio Amplifier & Equalizer
TUBES (Seven)	Types 12AX7 Preamp., 12AX7 AF Amp., 6C4 AF Amp., 12AU7 AF Amp-Phase Inverter, (2) 5881 Output, 5Y3GT Rectifier
POWER SUPPLY	105-120 Volts AC - 60 Cycles RATING . 82 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PILOT PART No.	STANDARD REPLACEMENT		
V1	Preamp.	12AX7	12AX7	9A	
V2	AF Amp.	12AX7	12AX7	9A	
V3	AF Amp.	6C4	6C4	6BG	
V4	AF Amp-Phase Inverter	12AU7	12AU7	9A	
V5	Audio Output	5881	5881	7S	
V6	Audio Output	5881	5881	7S	
V7	Rectifier	5Y3GT	5Y3GT	5T	

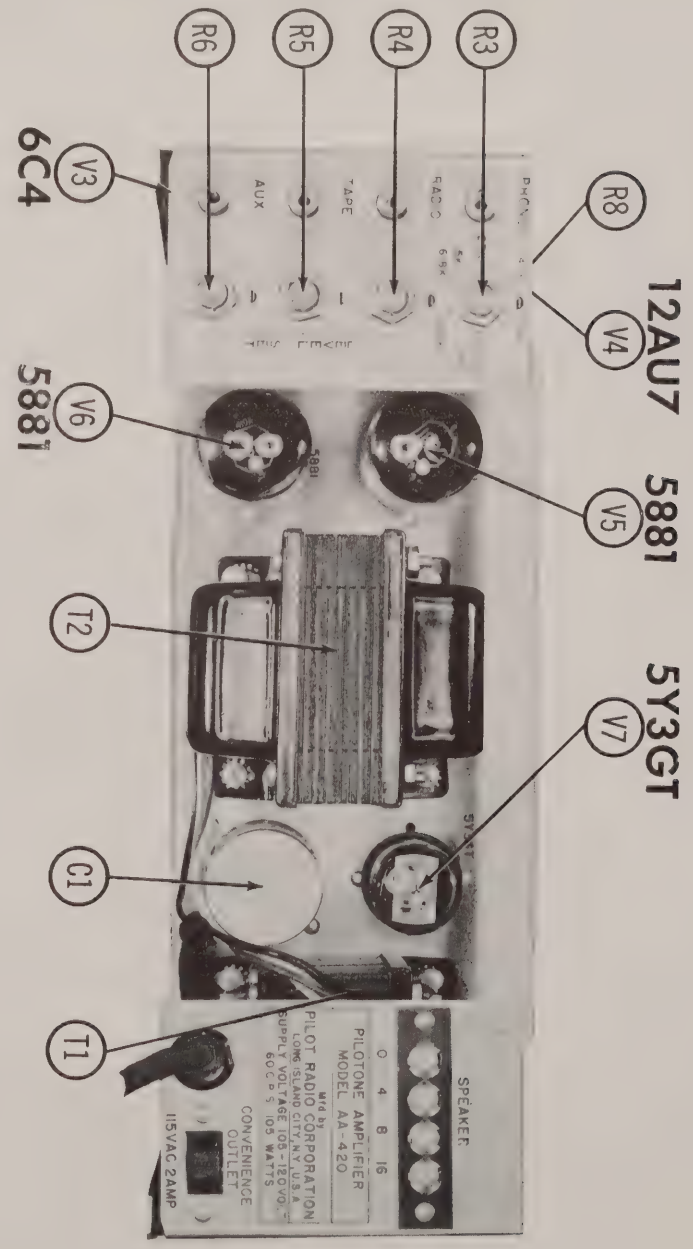
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	PILOT PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲20	450				FP448	TM-602020-450	Q-040	
B	■60	450					TD-20-450	FM-4540	
C	▲20	450							
C	20	450							
C2	100	50				TC3501	TD-100-50	MTH-5010	
C3A	■10	400					TM-4020-450	D-230	
B	▲40	400							
C	▲								Note 1
C4	50			D6-500	GP1K-500	UC-545		K-1450	
C5	.022	600		DF-203	817-02	PT6122	IMP6-S22	3306122	
C6	.022	600		DF-203	817-02	PT6122	IMP6-S22	3306122	
C7	.022	400		DF-203	817-02	PT4122	IMP4-S22	3304122	
C8	.0051	400							
C9	.033	400							
C10	800			DD-801	831-801	UC-5375		K-1380	
C11	.022	600		DF-203	817-02	PT6122	IMP6-S22	3306122	
C12	250			D6-251	GP2K-251	UC-5325		K-1325	
C13	.033	600				PT6133	IMP6-S33	3306133	
C14	50			D6-500	GP1K-500	UC-545		K-1450	
C15	1000			D6-102	GP2L-102	UC-521		K-1210	
C16	4.7			TCZ-4.7	NP0A-4R7	ZT-555		K-1550	
C17	1200			D6-122	GP2L-122	UC-5212		C-1212	
C18	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C19	.047	600		DF-503		PT6147	IMP6-S47	3306147	
C20	250			D6-251	GP2K-251	UC-5325		K-1325	
C21	.022	400		DF-203	817-02	PT4122	IMP4-S22	3304122	
C22	.1	600		DF-104		PT601	IMP6-P1	330601	
C23	.047	600		DF-503		PT6147	IMP6-S47	3306147	
C24	.047	600		DF-503		PT6147	IMP6-S47	3306147	
C25	.005	600		D6-502	GP2-333-502	PT625	IMP6-D5	330625	Note 2
C26	.0022	600		D6-222	GP2-333-222	PT6222	IMP6-D22	3306222	Note 3

Note 1: C3C section is a dummy lug.
Note 2: Some versions use .022MFD in this application.
Note 3: Not used in some versions.

POWER CHASSIS – TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PILOT PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ*	½	36-51					} Volume & Switch
B	1Meg†	½						
R2A	5Meg	½	B37-30A					Bass - Panel
B	5Meg	½						Treble - Rear
R3A	100KΩ	½	39-32C	Q11-128	A47-100K-S	AB-41	U-41	Phono
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	1Meg	½	39-39	Q11-137	A47-1Meg-S	AB-69	U-54	Radio Level
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	1Meg	½	39-39	Q11-137	A47-1Meg-S	AB-69	U-54	Tape Level
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	1Meg	½	39-39	Q11-137	A47-1Meg-S	AB-69	U-54	Aux. Level
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	25KΩ	½	39-33A	Q11-120	A47-25K-S	AB-26	SU-29	Hum Balance
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R7A

* Tapped at 200KΩ & 400KΩ - panel.
† Tapped at 300KΩ & 600KΩ - rear.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PILOT PART No.	IRC PART No.	
R8	6800Ω	½		BTS-6800	
R9	470KΩ	½		BTS-470K	
R10	220KΩ	½		BTS-220K	
R11	2.2Meg	½		BTS-2.2Meg	
R12	68KΩ	1		BTA-68K	
R13	470KΩ	½		BTS-470K	Note 1
R14	8200Ω 5%	½		BTS-8200 5%	
R15	100KΩ 5%	½		BTS-100K 5%	
R16	82KΩ 5%	½		BTS-82K 5%	
R17	1Meg	½		BTS-1Meg	
R18	15KΩ 5%	½		BTS-15K 5%	
R19	100KΩ 5%	½		BTS-100K 5%	
R20	150KΩ 5%	½		BTS-150K 5%	
R21	39KΩ 5%	½		BTS-39K 5%	
R22	3300Ω	1		BTA-3300	
R23	82KΩ	1		BTA-82K	
R24	15KΩ	½		BTS-15K	
R25	2200Ω	1		BTA-2200	
R26	82KΩ	1		BTA-82K	
R27	220KΩ 5%	½		BTS-220K 5%	
R28	220KΩ	½		BTS-220K	
R29	4700Ω 5%	½		BTS-4700 5%	
R30	220KΩ	½		BTS-220K	

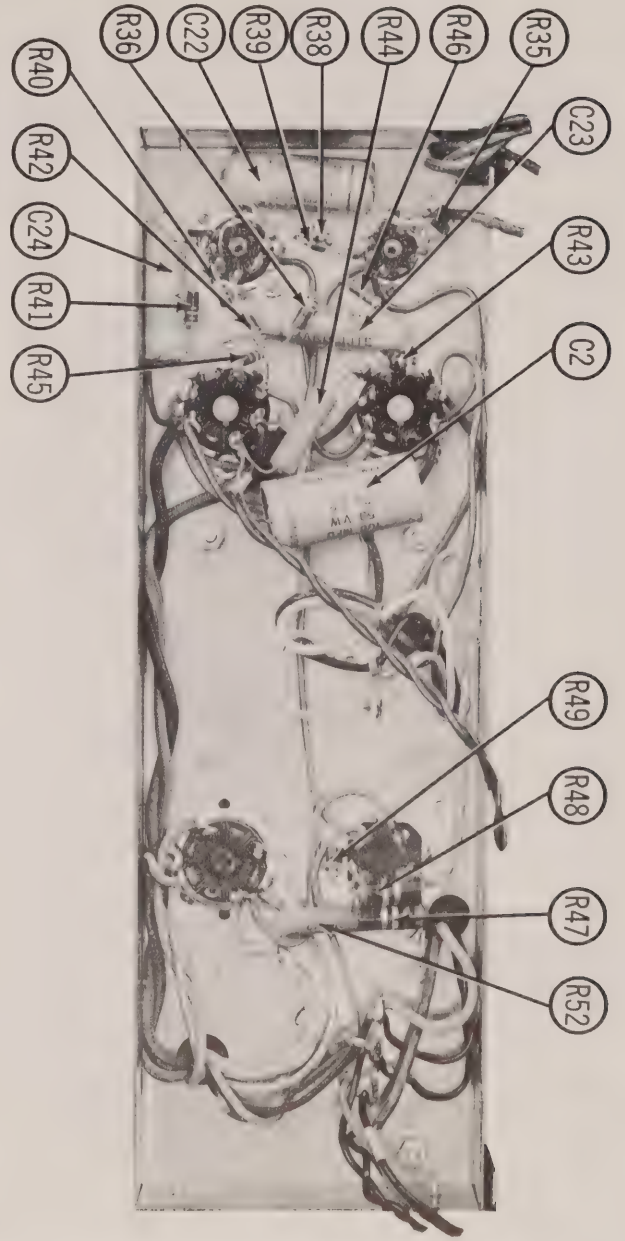
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PILOT PART No.	IRC PART No.	
R31	100KΩ 5%	½		BTS-100K 5%	
R32	2200Ω	1		BTA-2200	
R33	82KΩ	1		BTA-82K	
R34	39KΩ	½		BTS-39K	
R35	4700Ω	½		BTS-4700	
R36	100KΩ	½		BTS-100K	
R37	27KΩ	1		BTA-27K	
R38	470KΩ	½		BTS-470K	
R39	10KΩ	½		BTS-10K	
R40	220KΩ	½		BTS-220K	
R41	47KΩ 5%	½		BTS-47K 5%	
R42	47KΩ 5%	½		BTS-47K 5%	
R43	470KΩ	½		BTS-470K	
R44	250Ω	5		1 3/4A-250	
R45	470KΩ	½		BTS-470K	
R46	6800Ω	½		BTS-6800	
R47	12KΩ	2		BTB-12K	
R48	10KΩ	2		BTB-10K	
R49	10KΩ	½		BTS-10K	
R50	220KΩ	½		BTS-220K	
R51	39KΩ	½		BTS-39K	
R52	100Ω	5		1 3/4A-100	
R53	4.7Meg	½		BTS-4.7Meg	Note 2

Note 1: Some versions use a 330KΩ resistor in this application.
Note 2: Not used in all versions.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PILOT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .82A	744VCT .110ADC	5VAC @ 2A	6.3VAC @ 3A	55-42					

POWER CHASSIS – BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

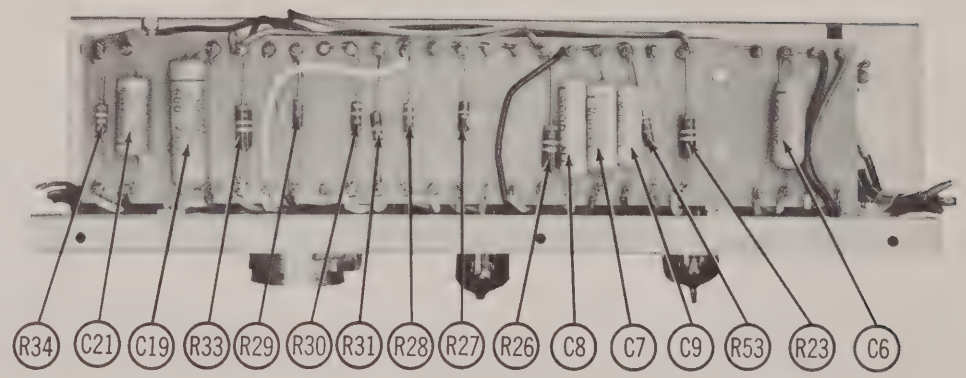
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PILOT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	8KΩ CT	16Ω Tap @ 8Ω @ 4Ω	56-36			S-31A ①	Z1405 ①	22S44 ①	① Drill new mounting holes.

MISCELLANEOUS

ITEM No.	PART NAME	PILOT PART No.	NOTES
M1	Pilot Light	68-6	#47, Bayonet
M2	Switch	100-99	Selector (Rotary - Wafer Type)
M3A	Switch	100-97	Bass Equalizer (Rotary - Wafer Type)
B	Switch		Treble Equalizer (Rotary - Wafer Type)
M4	Switch	101-29	Phono Level (SPDT - Slide Type)

PRE-AMP CHASSIS – REAR VIEW



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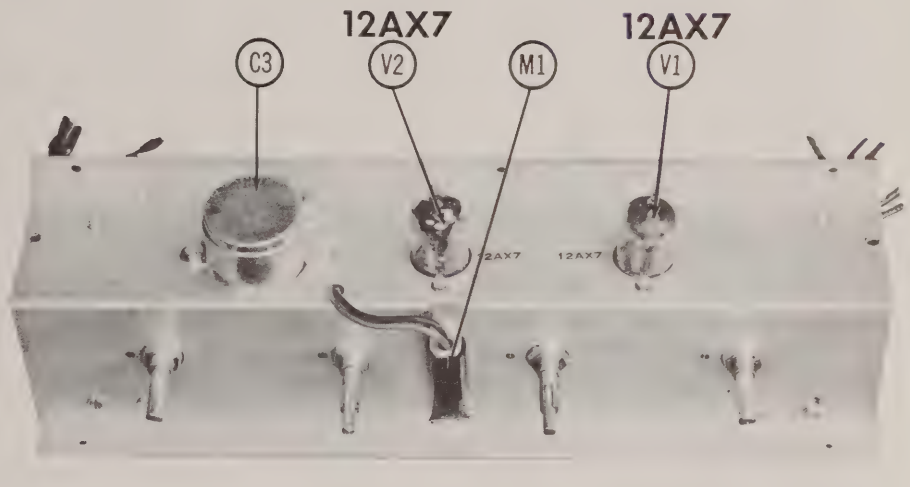
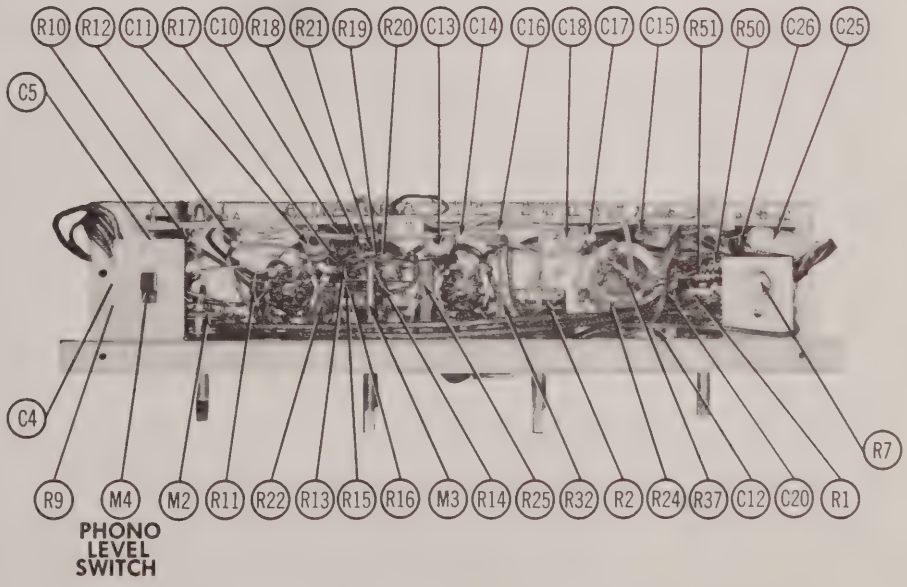
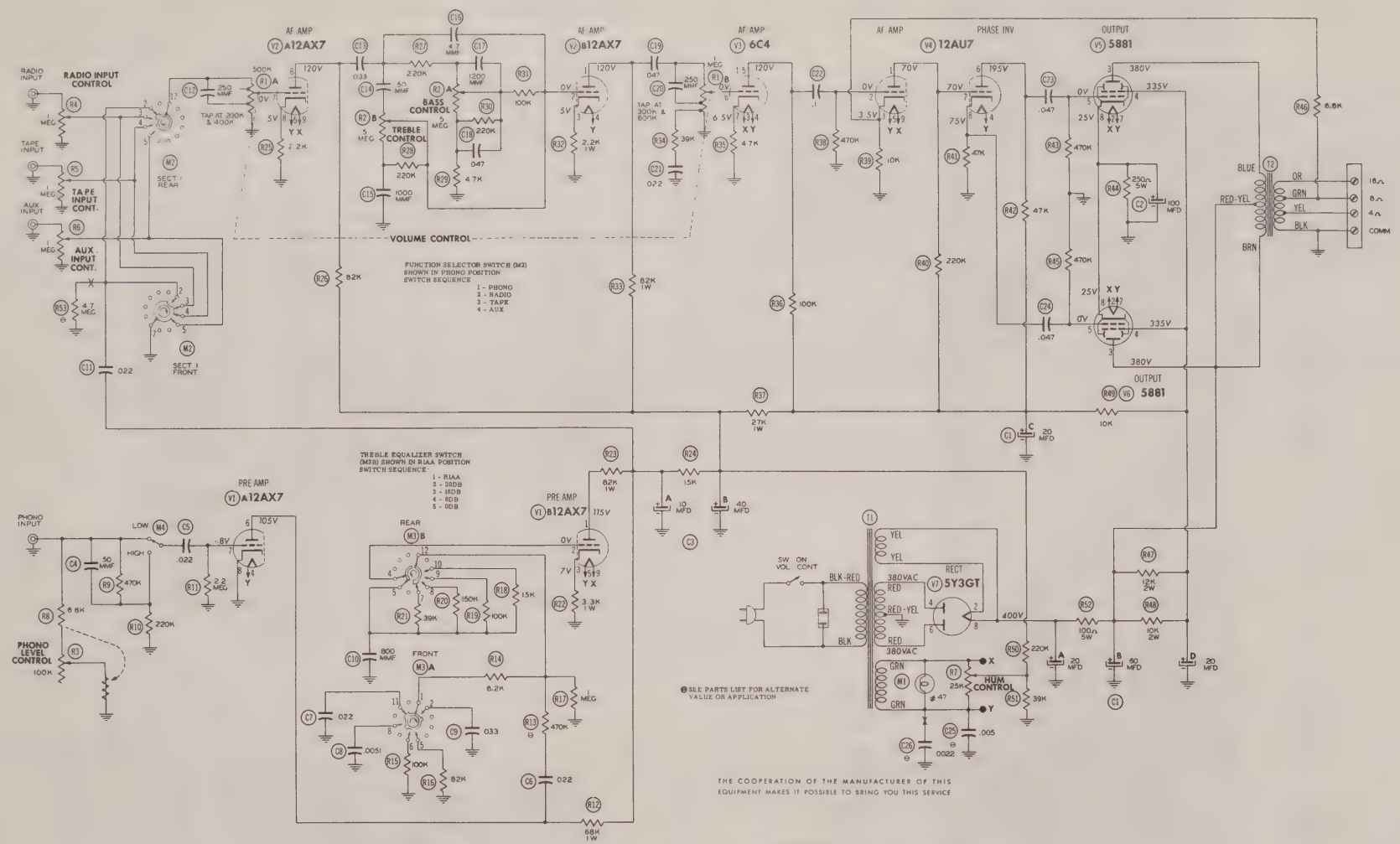
DENVER, COLORADO



PRE-AMP CHASSIS- TOP VIEW



PRE-AMP CHASSIS - BOTTOM VIEW



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†144KΩ	▲1.2Meg	3.3KΩ	50KΩ	50KΩ	†130KΩ	3.2Meg	0Ω	50KΩ
V 2	12AX7	†129KΩ	110KΩ	2.2KΩ	50KΩ	50KΩ	†129KΩ	0Ω	2.2KΩ	50KΩ
V 3	6C4	†150KΩ	NC	50KΩ	50KΩ	†150KΩ	150Ω	4.7KΩ		
V 4	12AU7	†240KΩ	470KΩ	4.2KΩ	50KΩ	50KΩ	†87KΩ	†240KΩ	47KΩ	50KΩ
V 5	5881	NC	50KΩ	†250Ω	†5.5KΩ	470KΩ	TP	50KΩ	250Ω	
V 6	5881	NC	50KΩ	†250Ω	†5.5KΩ	470KΩ	TP	50KΩ	250Ω	
V 7	5Y3GT	NC	70KΩ	NC	110Ω	NC	110Ω	NC	70KΩ	

† MEASURED FROM PIN 2 OF V1.
▲ MEASURED WITH EQUALIZER SWITCH IN MAXIMUM COUNTER CLOCKWISE POSITION.
NC - NO CONNECTION
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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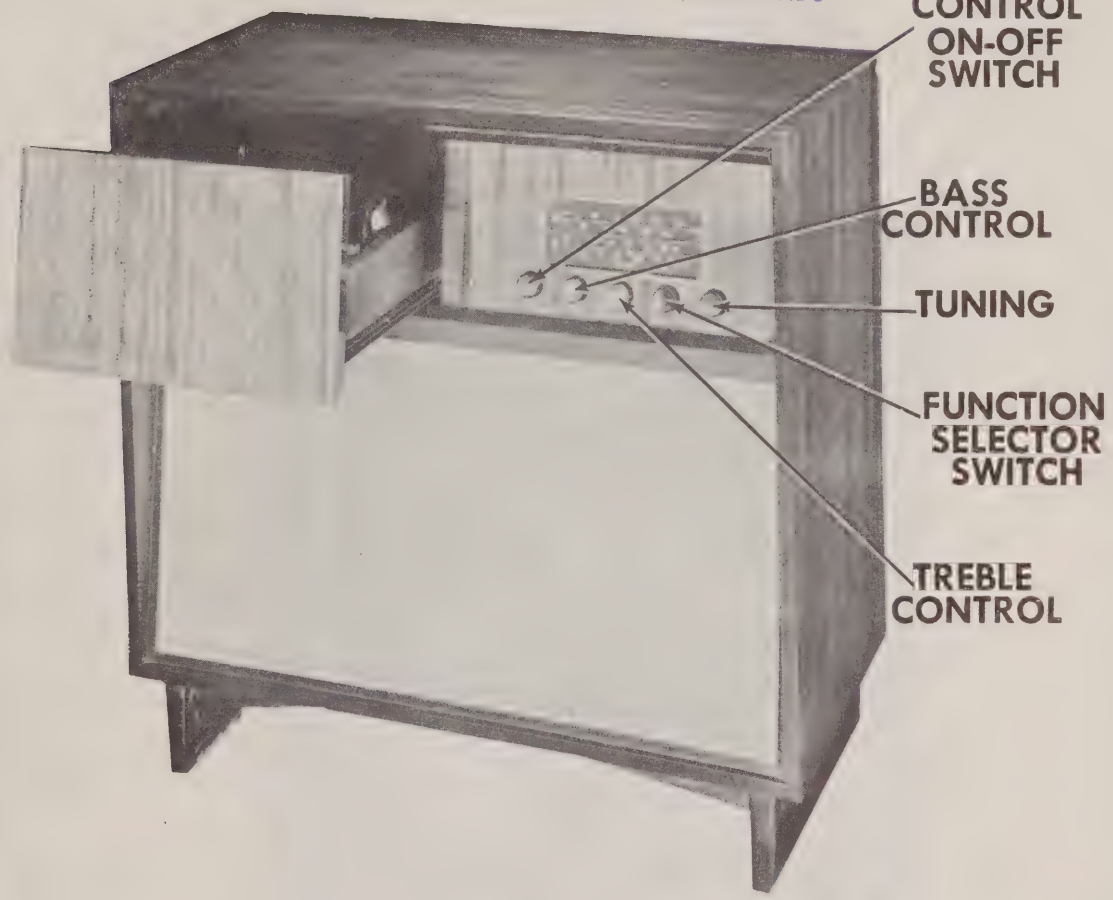
RETMA MEMBER

ROLAND MODEL 10XF1

PROPERTY OF
L. F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

ROLAND MODEL 10XF1



ROLAND MODEL 10XF1

TRADE NAME	Roland Model 10XF1	
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mt. Vernon, N.Y.	
TYPE SET	AC Operated AM-FM-Phono Combination Superheterodyne Receiver	
TUBES	Ten	
POWER SUPPLY	110-120 Volts AC	RATING .77 Amp. @ 117 VAC
TUNING RANGE-BROADCAST	540KC-1650KC	FREQ. MOD. 88MC-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT - SEE V-M MODEL 950 - PHOTOFACT SET #216 - FOLDER #11 OR RECORD CHANGER MANUAL CM-5.

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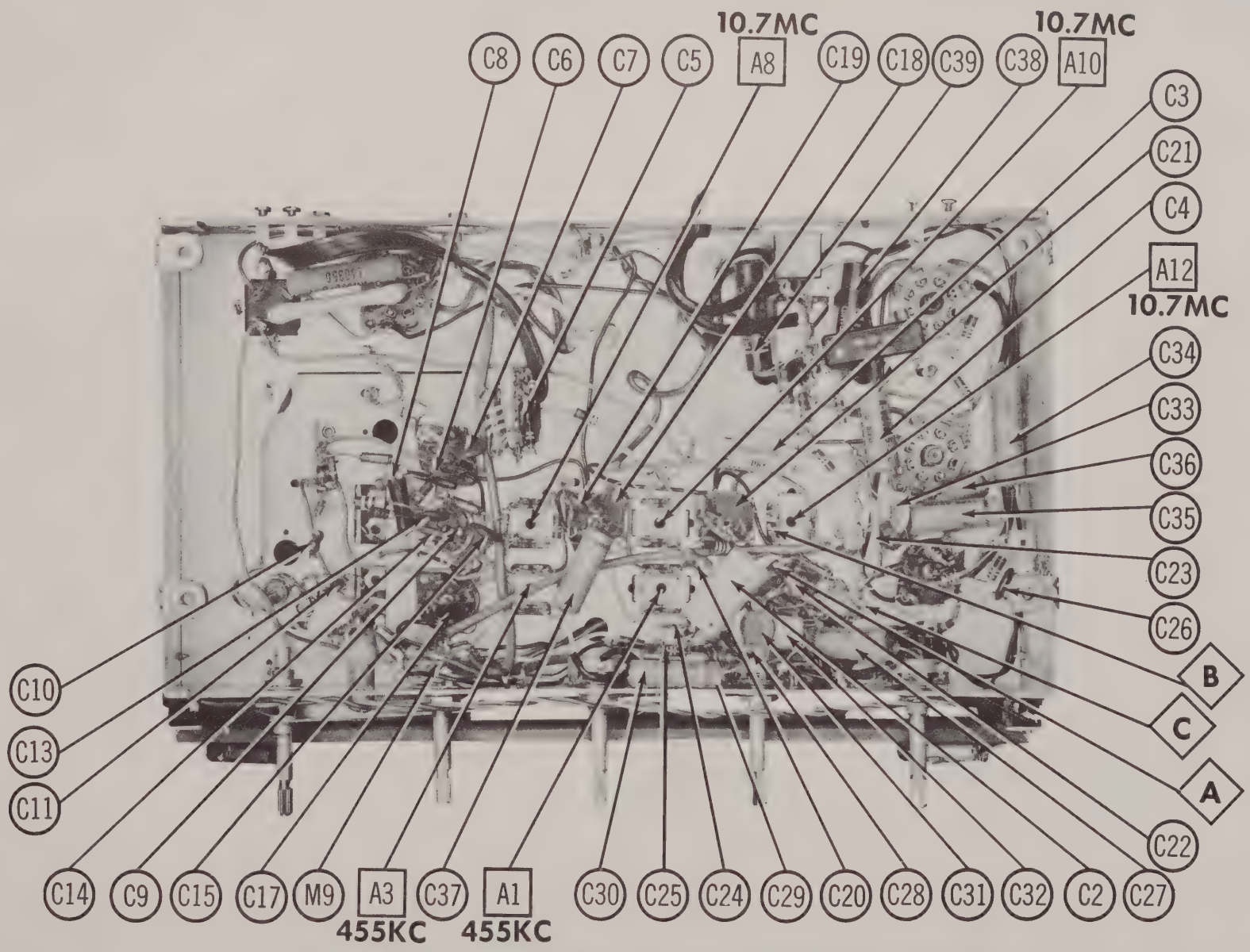
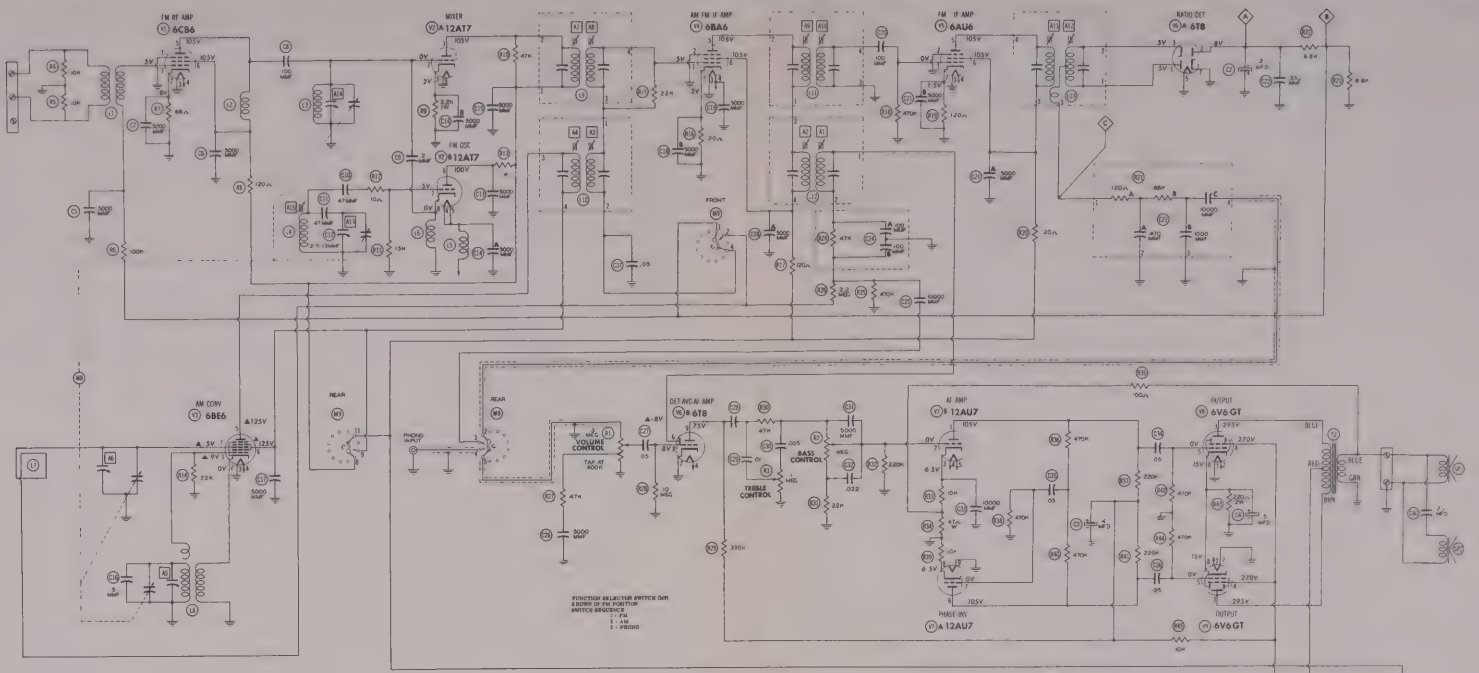
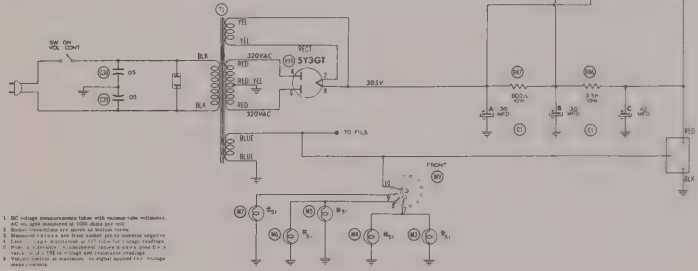


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION





AM IF=455KC
FM IF=10.7MC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	100KΩ	68Ω	0Ω	.1Ω	†4.1KΩ	†4.1KΩ	0Ω		
V 2	12AT7	†4.1KΩ	0Ω	2.2KΩ	.1Ω	1Ω	†5.1KΩ	15KΩ	.2Ω	0Ω
V 3	6BE6	22KΩ	.5Ω	0Ω	.1Ω	†*4.1KΩ	†*4.1KΩ	3.2Meg		
V 4	6BA6	6.8KΩ *2.9Meg	0Ω	0Ω	.1Ω	†4.1KΩ	†4.1KΩ	120Ω		
V 5	6AU6	470KΩ	0Ω	0Ω	.1Ω	†4.1KΩ	†4.1KΩ	120Ω		
V 6	6T8	INF	13.6KΩ	INF	.1Ω	0Ω	517KΩ	0Ω	10Meg	†340KΩ
V 7	12AU7	†230KΩ	22KΩ	10KΩ	.1Ω	.1Ω	†230KΩ	470KΩ	10KΩ	0Ω
V 8	6V6GT	NC	.1Ω	†300Ω	†600Ω	470KΩ	NC	0Ω	330Ω	
V 9	5V6GT	NC	.1Ω	†300Ω	†600Ω	470KΩ	NC	0Ω	330Ω	
V 10	5Y3GT	NC	200KΩ	NC	650Ω	TP	650Ω	NC	200KΩ	

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS OTHERWISE DESIGNATED
▲ MEASURED IN AM POSITION
† MEASURED FROM PIN 9 OF V10.
NC - NO CONNECTION
TP - TIE POINT

1 DC voltage measurements taken with vacuum tube voltmeter, AC no. ages measured at 1000 ohms per volt
2 Measurements are from socket pin to chassis ground
3 Balanced voltages are from socket pin to common negative
4 Line ... age monitored at 117 volts for voltage readings
5 Item 2 / Tolerance ± component values unless otherwise noted
6 Values ... at ... 1% in voltage and resistance readings
7 Values taken at receiver, no signal applied. For voltage measurements

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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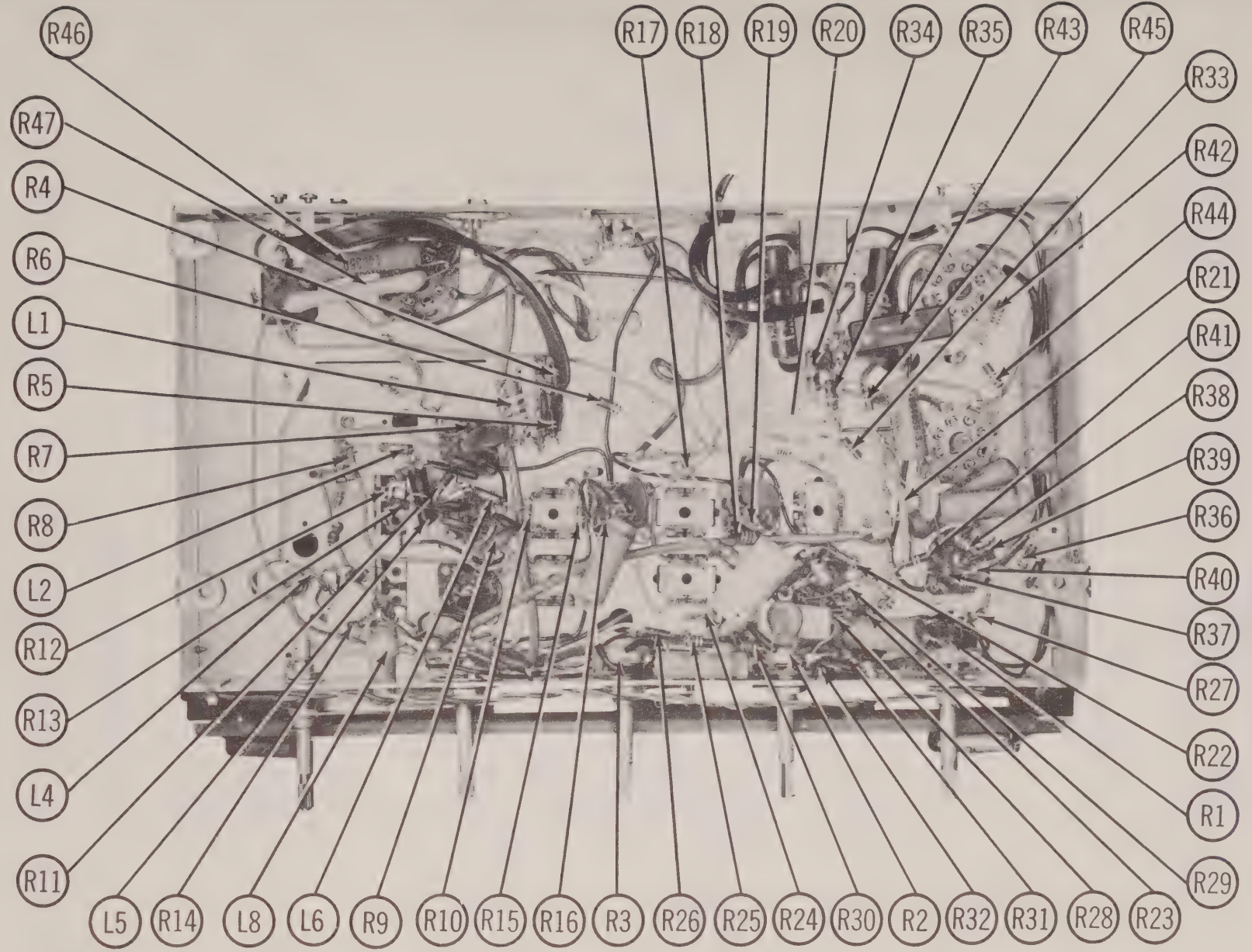
280-10



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. HANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Set tone control at treble position.
Tuning gang fully open and set pointer 1½" from right hand edge of dial back plate.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400~Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1650KC	"	"	"	A5	"
3.		Loop	1400KC	"	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.1MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open	DC probe to point (A). Common to chassis.	A7, A8, A9, A10	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe thru 1Meg to point (B). Common to point (C).	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.1MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open	Vert. Amp. to point (A). Low side to chassis.	A7, A8, A9, A10, A11	Disconnect stabilizer capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. thru 1Meg to point (B). Low side to chassis.	A12	Reconnect capacitor (C2). Adjust A12 so that 10.7MC occurs at center of cross-over lines similar to Fig. 2. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

* Adjustments necessary only for proper tracking or to cover FM range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	270Ω Carbon Resistors	High side to FM Ant. terminal. Low side to chassis.	108.5MC (Unmod)	FM	Tuning gang fully open	DC probe to point (A). Common to chassis.	A13	Adjust for maximum deflection.
7.	"	"	105MC	"	Tune to 105MC signal	"	A14	"
8.	"	"	87.5MC	"	Tuning gang fully closed	"	L3 *	Compress or expand L3 for maximum deflection.
9.	"	"	108.5MC	"	Tuning gang fully open	"	A13 *	Adjust for maximum deflection.
10.	"	"	90MC	"	Tune to 90MC signal	"	A15 *	"

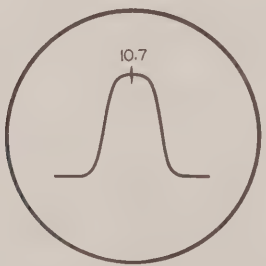


FIG. 1

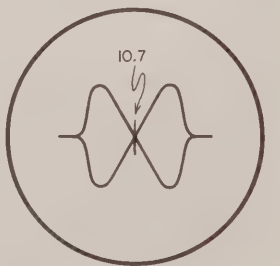


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ROLAND PART No.	STANDARD REPLACEMENT		
V1	FM RF Amplifier	6CB6	6CB6	7CM	
V2	FM Osc.-Mixer	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	AM-FM IF Amp.	6BA6	6BA6	7BK	
V5	FM IF Amp.	6AU6	6AU6	7BK	
V6	Ratio Det.-AM Det. AVC-AF Amp.	6T8	6T8	9E	
V7	AF Amp.-Phase Inv.	12AU7	12AU7	9A	
V8	Audio Output	6V6GT	6V6GT	7S	
V9	Audio Output	6V6GT	6V6GT	7S	
V10	Rectifier	5Y3GT	5Y3GT	5T	

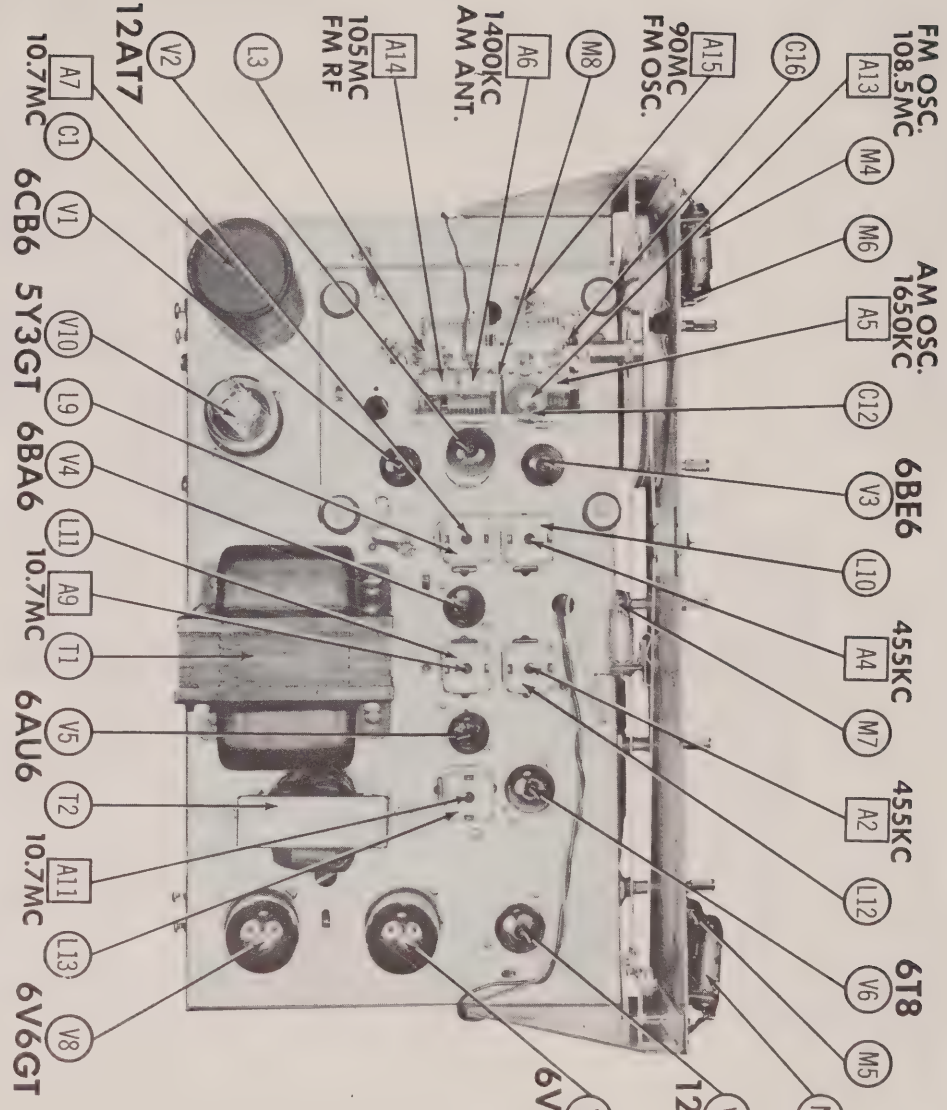
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	ROLAND PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲30	450				FP396.14	TM-4048	T-160	
B	■30	450							
C	▲40	450							
C2	2	50				TC302	TD-2-50	MMT-0505	
C3	4	350				TC60	TD-4-450	FM-4504	
C4	5	50				TC30	TD-5-50	MMT-0505	
C5	5000			DD-502	811-005	DC-525		C-1250	
C6	5000			DD-502	811-005	DC-525		C-1250	
C7	5000			DD-502	811-005	DC-525		C-1250	
C8	100			TCN-100	N750L-101	NT-531			
C9	2								
C10	47			D6-470	GP1K-470	UC-5447		K-1447	
C11	47			D6-470	GP1K-470	UC-5447		K-1447	
C12	2.5-13			822-BZ					
C13	5000			DD-502	811-005	DC-525		C-1250	
C14A	5000			DD2-502	811-005	DC-525		C-1250	
B	5000				811-005	DC-525		C-1250	
C15	5000			DD-502	811-005	DC-525		C-1250	
C16	5			D6-050	GP1K-050			K-1550	
C17	5000			DD-502	811-005	DC-525		C-1250	
C18A	5000			DD2-502	811-005	DC-525		C-1250	
B	5000				811-005	DC-525		C-1250	
C19	5000			DD-502	811-005	DC-525		C-1250	
C20	100				811-005	DC-525		C-1250	
C21A	5000			DD2-502	811-005	DC-525		C-1250	
B	5000				811-005	DC-525		C-1250	
C22	330				811-331	UC-5333		K-1333	
C23A	470				811-471	UC-5347		K-1347	
B	1000			♦PC225	801-001	DC-521		K-1210	
C	10000				811-01	DC-511			
C24A	100			†PC-50	801-101	UC-531		K-1310	
B	100				801-101	UC-531		K-1310	
C25	10000			DD-103	811-01	DC-511			
C26	5000			DD-502	811-005	DC-525		C-1250	
C27	.05	200		DF-503		PT415	IMP2-S5	330215	
C28	.1	400		DF-104		PT401	IMP4-P1	330401	
C29	.01	200		D6-103	811-01	DC-511	IMP4-S1	330411	
C30	.005	400		D6-502	811-005	DC-525	IMP6-D5	330425	
C31	5000			DD-502	811-005	DC-525		C-1250	
C32	.022	400				PT4122	IMP6-S22	3304122	
C33	10000			DD-103	811-01	DC-511			
C34	.05	400		DF-503		PT415	IMP4-S5	330415	
C35	.05	200		DF-503		PT415	IMP2-S5	330215	
C36	.05	400		DF-503		PT415	IMP2-S5	330415	
C37	.05	200		DF-503		PT415	IMP2-S5	330215	
C38	.05	400		DF-503		PT415	IMP4-S5		
C39	.05	400		DF-503		PT415	IMP4-S5		
C40	2.0	50					MT2-2		

♦ Items C23A, C23B, C23C, R21A and R21B are combined in one unit.
† Items C24A, C24B and R24 are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ROLAND PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	3Meg	½	VC-67		A47F-3Meg	ABT-8515	UT-457	Volume tapped at 400KΩ
B	Shaft		Not Req.		KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.		SWE-12	KB-1	US-26	Attach to R1A
R2A	1Meg	½	VC-66	Q11-137	A47-1Meg-S	AB-69	U-54	Bass
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	1Meg	½	VC-66	Q11-137	A47-1Meg-S	AB-69	U-54	Treble
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ROLAND PART No.	IRC PART No.	
R4	10KΩ	½		BTS-10K	
R5	10KΩ	½		BTS-10K	
R6	100KΩ	½		BTS-100K	
R7	68Ω	½		BTS-68	
R8	120Ω	½		BTS-120	
R9	2200Ω	1		BTA-2200	
R10	47KΩ	½		BTS-47K	
R11	15KΩ 5%	½		BTS-15K 5%	
R12	10Ω	½		BTS-10	
R13	1000Ω	½		BTS-1000	
R14	22KΩ	½		BTS-22K	
R15	22KΩ	½		BTS-22K	
R16	120Ω	½		BTS-120	
R17	120Ω	½		BTS-120	
R18	470KΩ	½		BTS-470K	
R19	120Ω	½		BTS-120	
R20	120Ω	½		BTS-120	
R21A	120Ω	½	♦	BTS-120	
B	68KΩ	½		BTS-68K	
R22	6800Ω	½		BTS-6800	
R23	6800Ω	½		BTS-6800	
R24	47KΩ	½	†	BTS-47K	
R25	470KΩ	½		BTS-470K	
R26	2.2Meg	½		BTS-2.2Meg	
R27	47KΩ	½		BTS-47K	
R28	10Meg	½		BTS-10Meg	
R29	330KΩ 5%	½		BTS-330K 5%	
R30	47KΩ	½		BTS-47K	
R31	22KΩ	½		BTS-22K	
R32	220KΩ	½		BTS-220K	
R33	10KΩ	½		BTS-10K	
R34	47Ω	1			
R35	100Ω	½		BTS-100	
R36	470KΩ	½		BTS-470K	
R37	220KΩ	½			
R38	470KΩ	½		BTS-470K	
R39	10KΩ	½		BTS-10K	
R40	470KΩ	½		BTS-470K	
R41	220KΩ	½		BTS-220K	
R42	470KΩ	½		BTS-470K	
R43	220Ω	2			
R44	470KΩ	½		BTS-470K	
R45	10KΩ	½		BTS-10K	
R46	3500Ω	10			
R47	600Ω	10		1 3/4A-600	

♦ Items R21A, R21B, C23A, C23B and C23C are combined in one unit.
† Items R24, C24A and C24B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ROLAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.77A	614VCT .113ADC	5VAC @2A	6.3VAC @3.5A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ROLAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	7.2KΩ CT	11.2Ω		A-3823 ①	A-2904 ①	S-55X	Z1011	26S46 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	JENSEN PART No.	QUAM PART No.	
SP1	12"	PM	11.2Ω		ST-831 Mod. K-210	12A6CO	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ROLAND PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Trans.	0Ω	0Ω					
L2	RF Choke	.2Ω			19-1002		4606	2.7 Microhenries
L3	FM RF Coil	0Ω						
L4	FM Osc. Coil	0Ω						
L5	Fil. Choke	0Ω			19-1004		4610	5.8 Microhenries
L6	Cathode Choke	.2Ω			19-1002		4606	2.7 Microhenries
L7	AM Loop Ant.	1.1Ω						
L8	AM Osc. Coil	.6Ω	5.5Ω		14-1073*		69-Osc. ■	
L9	1st FM IF	.6Ω	.6Ω	LF-58	16-3487	FM-254	1463	
L10	1st AM IF	15Ω	15Ω	LF-54	16-6758	BC-352	12-C1	
L11	2nd FM IF	.6Ω	.6Ω	LF-52	16-3487	FM-254	1463	
L12	2nd AM IF	10Ω	10Ω	LF-59	16-6758	BC-353	12-C2	
L13	Ratio Det.	1.5Ω	.8ΩCT	LF-53	17-3488▲	FM-255	1465	Tertiary winding = .4Ω

* Leads sufficient mounting support.
■ Drill new mounting hole.
▲ Enlarge chassis hole and drill mounting holes.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ROLAND PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		55-T	GD-J	47	0-1 or S-1 & 0-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

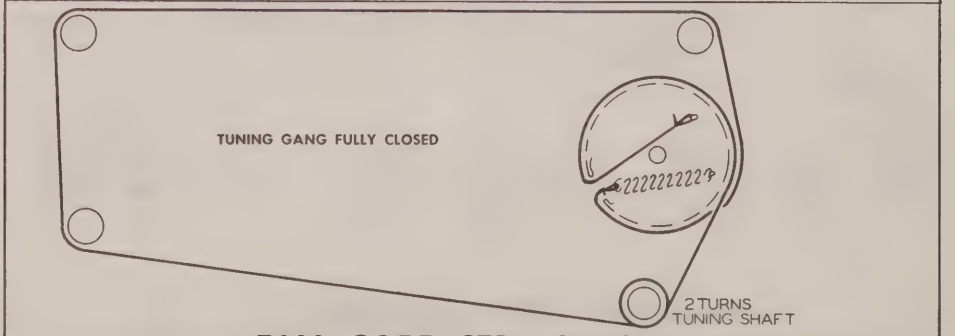
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	ROLAND PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2		*S-67 or †S-66 or ♦†S-66SD or ♦S-66D	†AC-434 or †AC-434D1 or †♦AC-434D2 or ♦AC-434D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

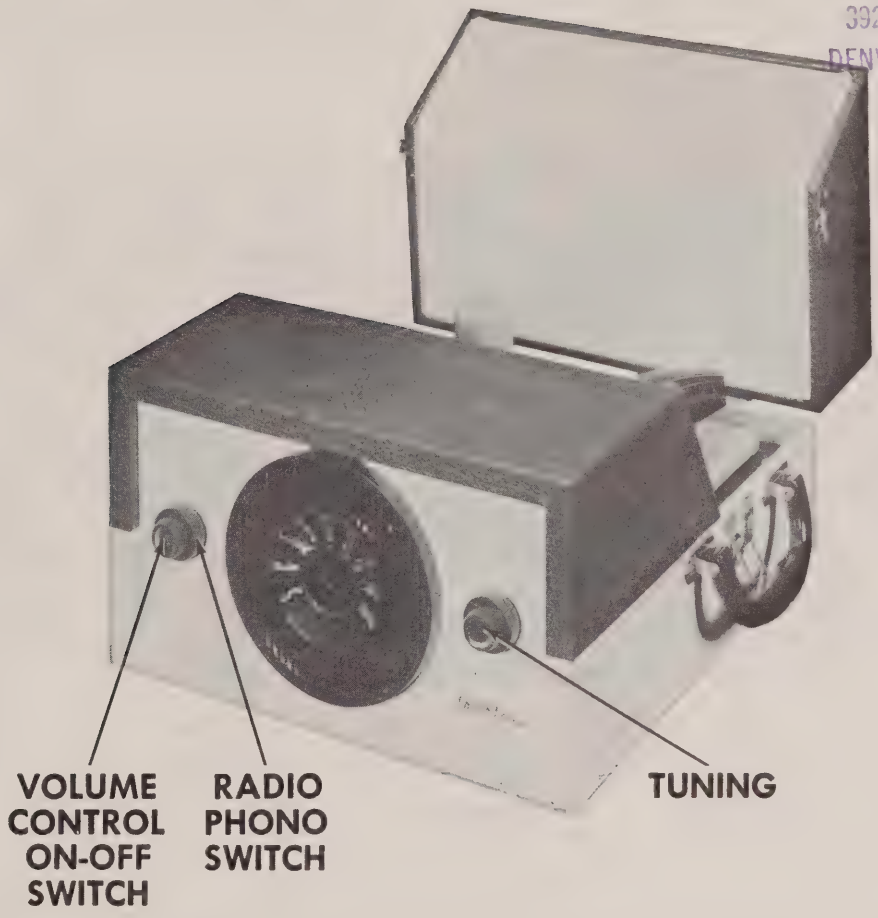
ITEM No.	PART NAME	ROLAND PART No.	NOTES
M3	Dial Light		#51, FM
M4	Dial Light		#51, FM
M5	Dial Light		#51, AM
M6	Dial Light		#51, AM
M7	Pilot Light		#51, Phono
M8	Tuning Cap.	CV-66	2 Gang (32-500MMF, 21-185MMF)
M9	Switch		Selector (Rotary - wafer type)



DIAL CORD STRINGING

COPY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRUETONE
MODEL D2560A



TRUETONE
MODEL D2560A

TRADE NAME	Truetone Model D2560A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC Operated Radio-Phono Combination Superheterodyne Receiver With 45RPM Automatic Record Changer
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles — RATING .23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC - 1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna terminal lug. Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1625KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

RECORD CHANGER UNIT - CRESCENT MODEL 451.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D2560A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.
C1A	▲40	150	3X40-1.5			FP311.5	TM-T40-150	T-045
B	40	150						
C	■40	150						
C2	.05	400	C054	DF-503		PT415	IMP4-S5	330415
C3A	100		♦PC50	♦PC-50	♦1403-01	UC-531		K-1310
B	100					UC-531		K-1310
C4	5000		C005D	DD-502	811-005	DC-525	IMP6-D5	C-1250
C5A	5000		†PC70	†PC-70	†1406-01			
B	250							
C								
C6	5000		C005D	DD-502	811-005	DC-525	IMP6-D5	C-1250
C7	.05	400	C054	DF-503		PT415	IMP4-S5	330415
C8	.05	400	C054	DF-503		PT415	IMP4-S5	330415
C9	.1	400	C104	DF-104		PT401	IMP4-P1	330401

♦ Items C3A, C3B and R4 are combined in one unit.
† Items C5A, C5B, C5C, R7A and R7B are combined in one unit.
When replacing items separately, C5B and C5C should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A								Radio-Phono Switch
B	1Meg	½	VRP-105					Volume & Switch

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22KΩ	½	R223.5	BTS-22K	
R3	330Ω	½	R331.5	BTS-330	
R4	47KΩ	½	♦PC50	BTS-47K	
R5	2.2Meg	½	R225.5	BTS-2.2Meg	
R6	10Meg	½	R107.5	BTS-10Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7A	500KΩ	½	†PC70	BTS-470K	
B	500KΩ	½		BTS-470K	
R8	150Ω	½	R151.5	BTS-150	
R9	220Ω	1	R2211	BTA-220	
R10	1000Ω	1	R1031	BTS-1000	

♦ Items R5, C3A and C3B are combined in one unit.
† Items R7A, R7B, C5A, C5B and C5C are combined in one unit.

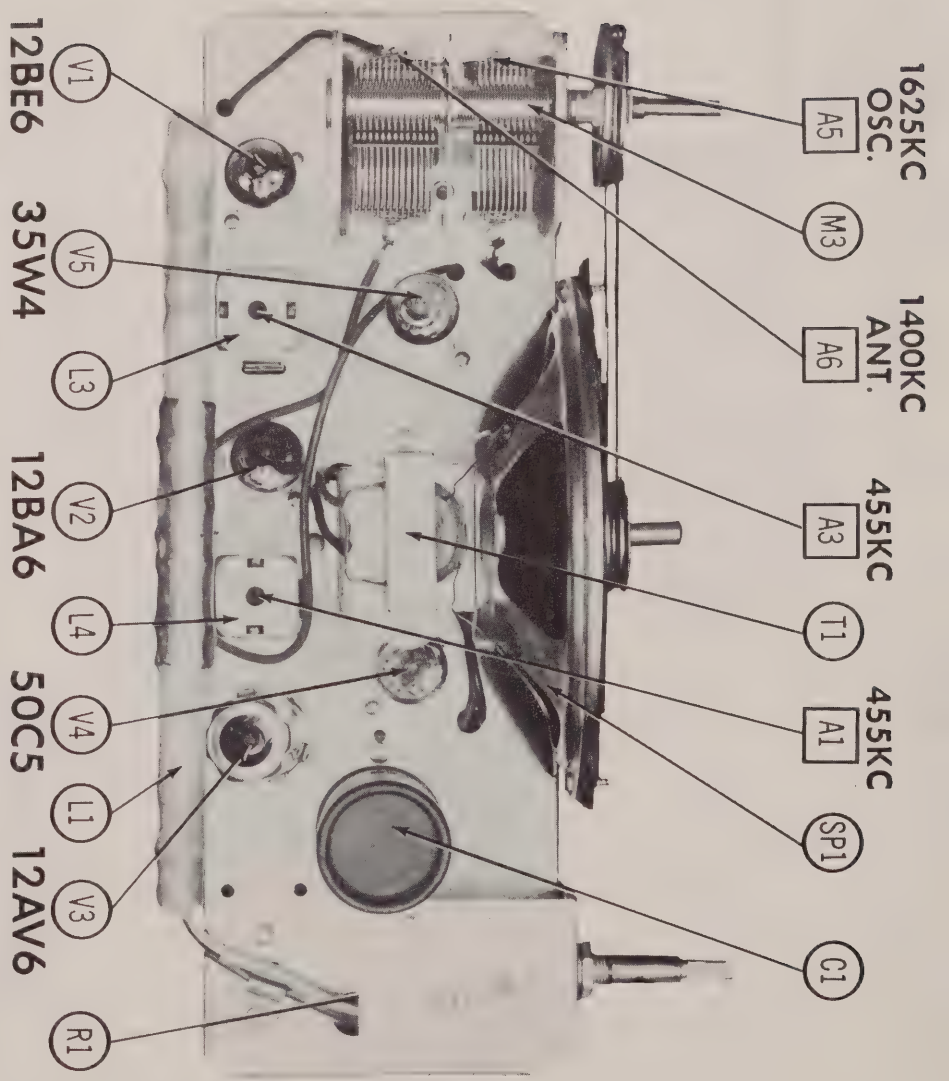
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: TRUETONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	3.6Ω	Part of speaker	A-3332	A-3025	S-12X	Z1101	26S58	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	5"	PM	3.6Ω	SPK-105	ST-105 Mod. P5-X	5A1	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	. 5Ω		LAT85				
L2	Osc. Coil	. 6Ω	8Ω	LOT85	14-1073		69-Osc. *	
L3	Input IF	17Ω	17Ω	LIFT67	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	LIFT67	16-6758	BC-353	12-C2	

* Drill mounting holes.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA TRUETONE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1		51-1J	G-J	47	0-1 or S-1	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

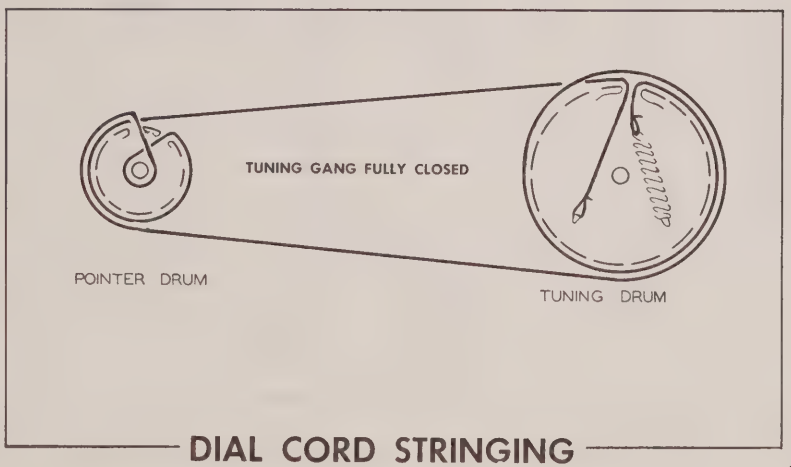
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA TRUETONE PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2		*A-84LP or †A-74LP or ♦A-74LPD	*A-304 or †A-332 or ♦A-332D	†W-3MGS or ♦W-3MGD	* Metal † Jewel ♦ Diamond

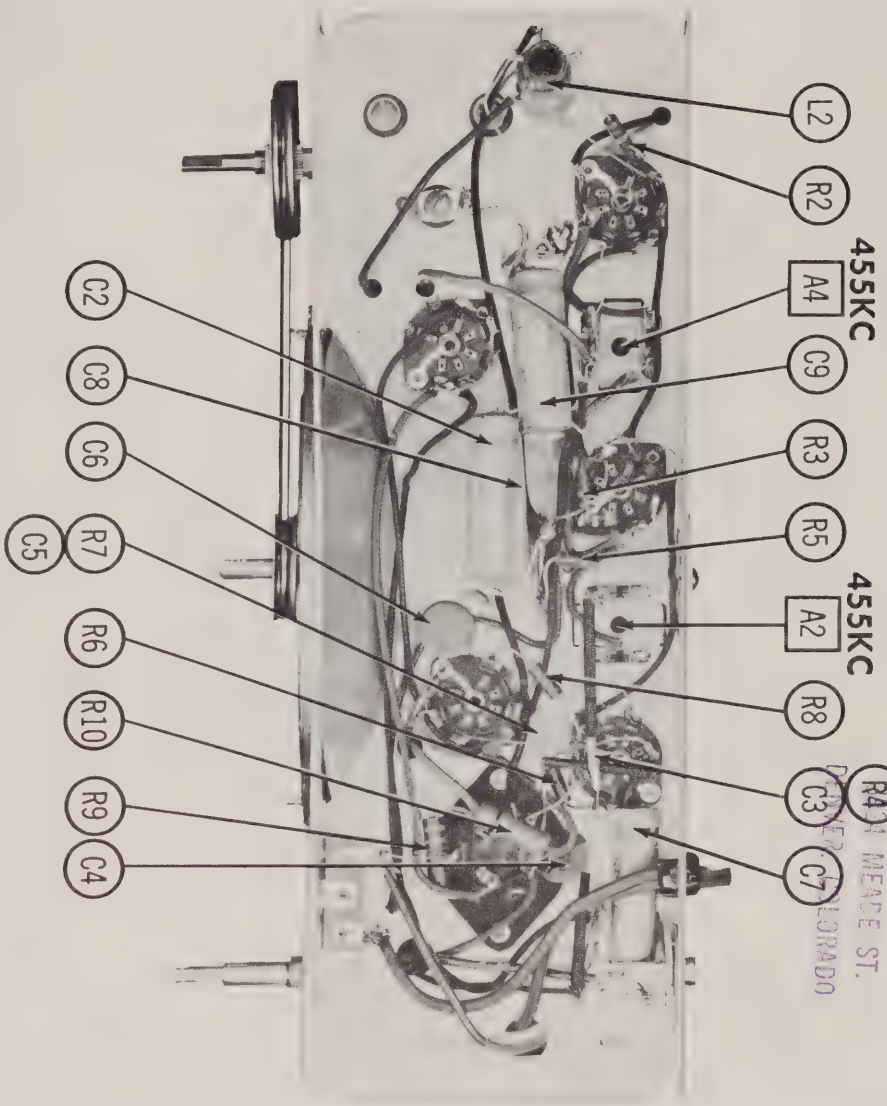
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	Tuning Cap.	VCP105	2 Gang (32-450MMF; 25-190MMF)
	Cabinet	P2801-B	
	Knob	P2802-B	On-Off-Volume & Tuning
	Knob	P2803-B	Radio-Phono-Switch
	Dial Pointer	P2503-B	



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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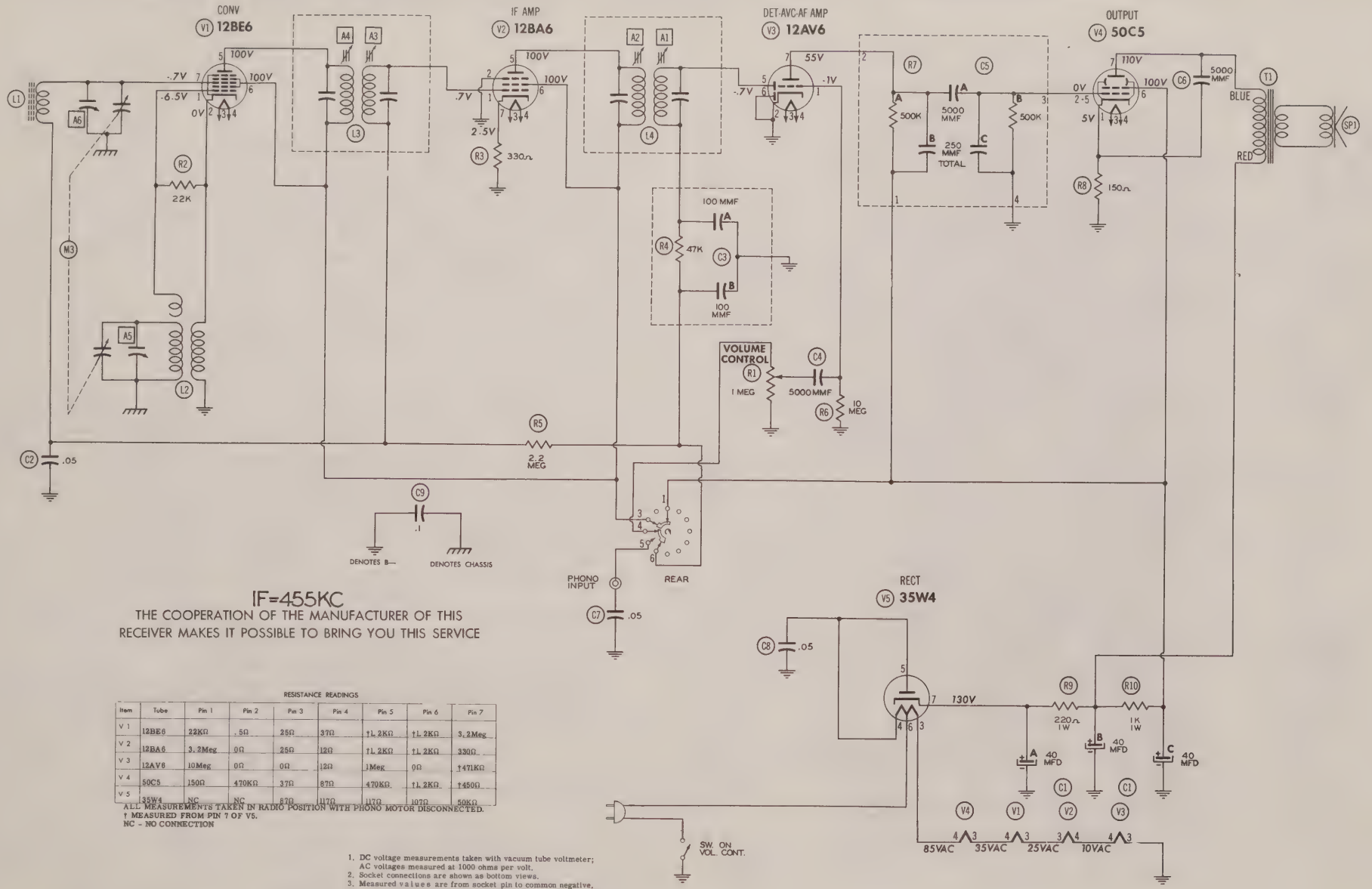
TRUETONE
MODEL D2560A



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	25Ω	37Ω	†1.2KΩ	†1.2KΩ	3.2Meg
V 2	12BA6	3.2Meg	0Ω	25Ω	12Ω	†1.2KΩ	†1.2KΩ	330Ω
V 3	12AV6	10Meg	0Ω	0Ω	12Ω	1Meg	0Ω	†471KΩ
V 4	50C5	150Ω	470KΩ	37Ω	87Ω	470KΩ	†1.2KΩ	†450Ω
V 5	35W4	NC	NC	87Ω	117Ω	117Ω	107Ω	50KΩ

ALL MEASUREMENTS TAKEN IN RADIO POSITION WITH PHONO MOTOR DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
NC – NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT STANDARD NOTATION SCHEMATIC
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WILCOX-GAY
MODELS 4B10, 4F10

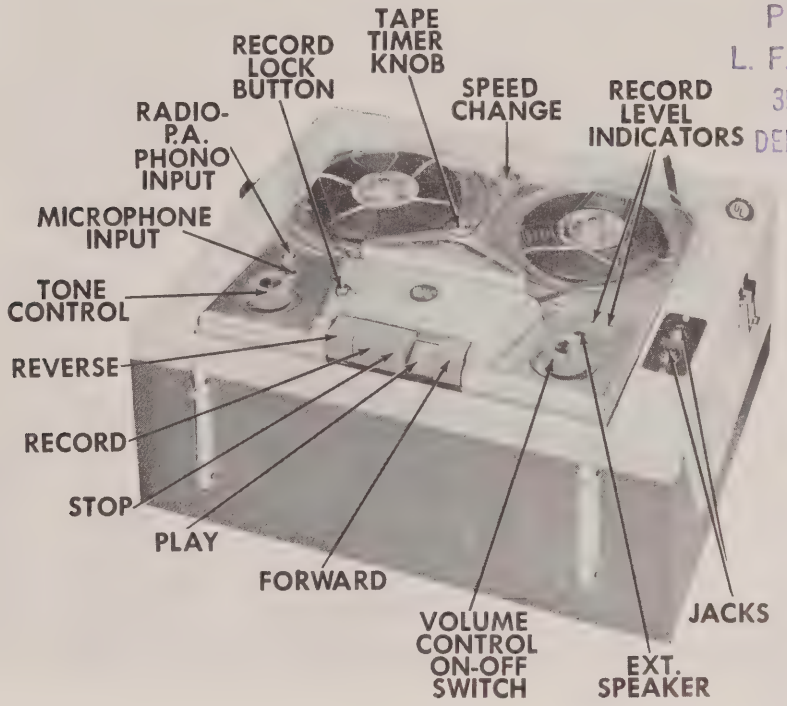

Figure 1

GENERAL INFORMATION

Wilcox-Gay "Recordio" Models 4B10 and 4F10 are mechanically alike. The major difference between the two models is in the amplifiers used. Notice the difference in the schematics located toward the rear of this manual.

Models 4B10 and 4F10 feature fingertip operation for Fast Forward, Playback, Stop, Record, and Fast Reverse. These recorders are designed to record and play back two tracks of material on standard width recording tape. Any reel size up to 7" can be used. Two neon recording indicators simplify the recording level setting. New recordings can be made on previously recorded tape since the erase head is automatically positioned when the "Record" button is pressed, or the same recording may be played back indefinitely. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speakers, or an external speaker may be used by connecting to the "Ext. Spkr." jack.

Recordio Models 4B10 and 4F10 have two tape speeds, 3 3/4" and 7 1/2" per second. Using both tracks of the tape the recording time is as follows:

SIZE	3 3/4" SPEED	7 1/2" SPEED
5" reel	1 hour	1/2 hour
7" reel	2 hours	1 hour

These units are designed to operate on 60 cycle, 115 volt, AC supply only. Before connecting to your line supply, be absolutely certain that it agrees with the above specifications.

Manufactured by:

Wilcox-Gay Corporation
Charlotte, Michigan

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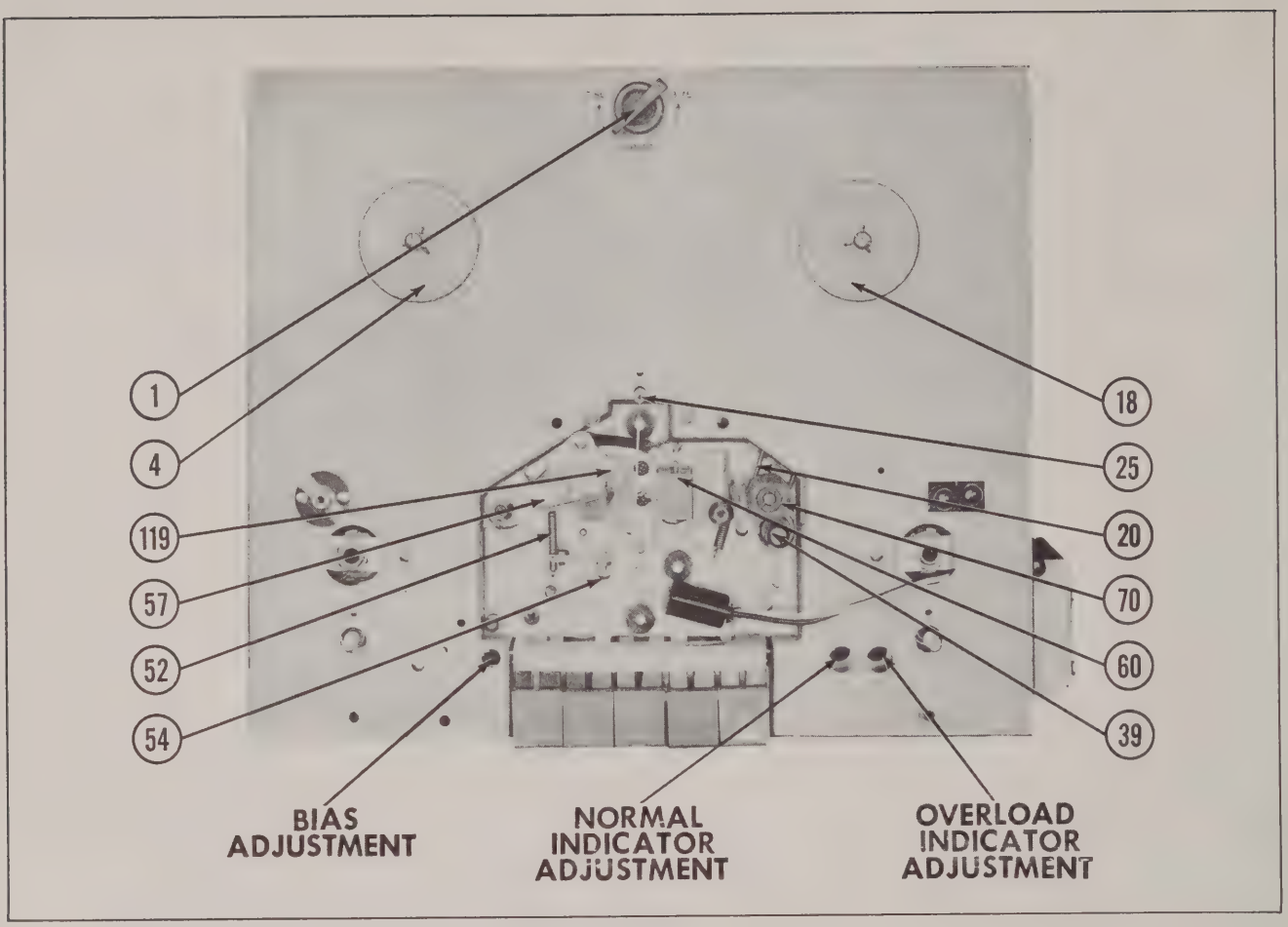

Figure 2

OPERATING INSTRUCTIONS

Preparation For Operation-

1. Remove the AC power cord, 5" reel of tape, empty reel and the microphone from the storage compartment.

2. Depress the "Stop" button.

3. Plug the AC cord into a convenient wall receptacle of the proper rating.

4. Set speed change knob to 7.50 or 3.75 as desired.

5. Place Remote-Normal switch in "Normal" position.

CAUTION: Do not turn speed change knob unless "Stop" button is depressed.

When the Forward or Reverse buttons are depressed, the Record and Play buttons are locked so that they cannot be pressed down, with the possibility of spilling tape. The buttons should always be pressed down firmly until they latch and the Stop button must be depressed before changing functions or speeds of the recorder.

IMPORTANT: Always depress the Stop button when the machine is not in use.

Speed Change Knob-

The arrow on the speed change knob should point at 7.50 or 3.75 according to the speed desired. These recorders have two speeds, 7 1/2" and 3 3/4" per second. The arrow pointing at 7.50 means the unit will operate at the fast speed or 7 1/2" per second.

CAUTION: Turning the speed change knob while the unit is operating will not change the speed. The Stop button must be depressed before the speed can be changed.

Threading The Tape-

1. Place a full reel of tape on the left (supply) spindle, making certain one of the reel slots catch the protrusions of the pan. Unwind about 14" of tape from the supply reel.

2. Insert free section of tape into the tape slot.

3. Insert free end of tape into one of the three slots in the hub of the right (take-up) reel and while holding the tape in place give the reel two or three turns until the tape is secured.

4. The dull side of the tape should always face away from the operator (rear of unit).

To Record From Microphone-

1. Turn the On-Off Volume control to the right until a click is heard and allow about 30 seconds for

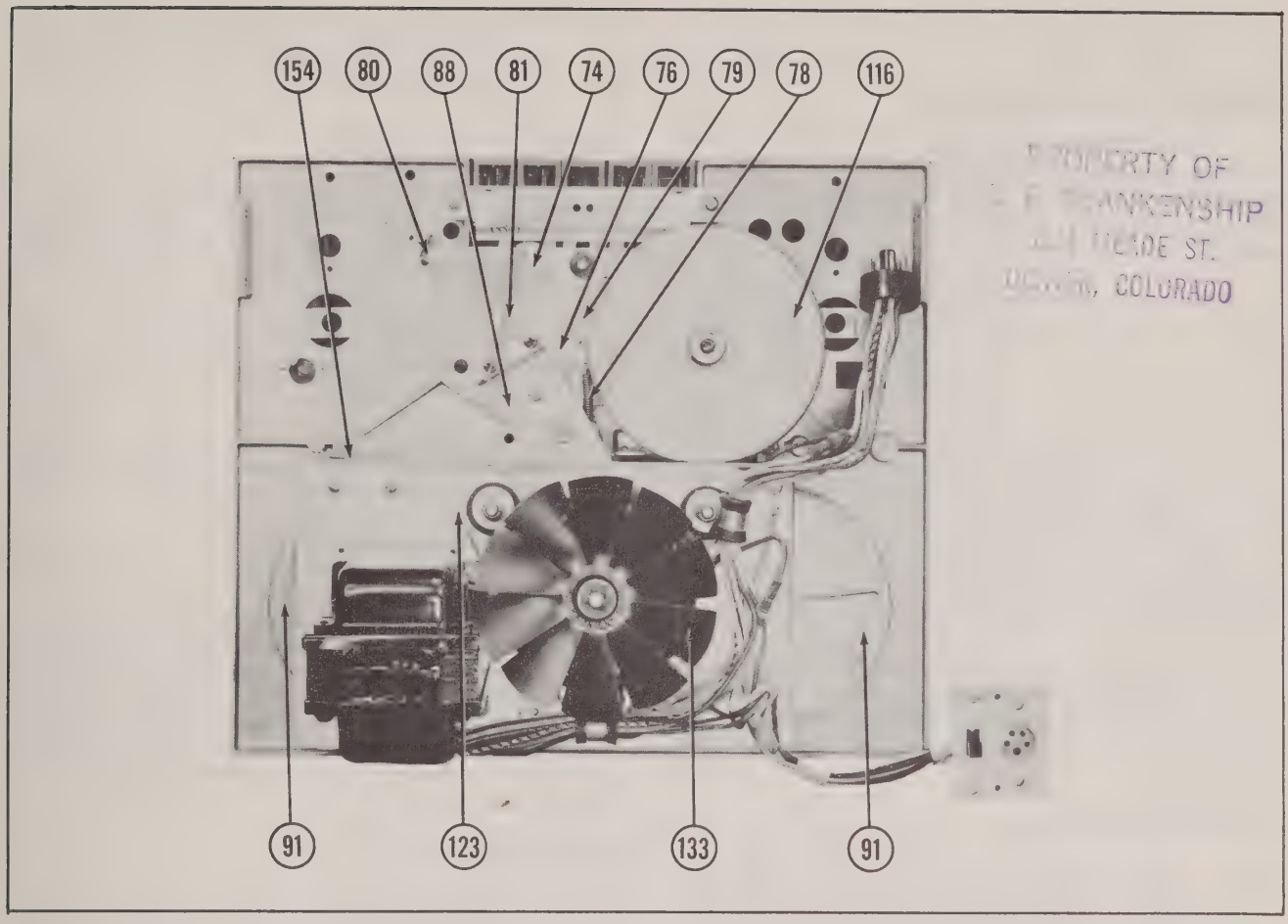

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Figure 3

the unit to warm up. The pilot light located above the Stop button will glow when the unit is turned on.

2. Insert the microphone plug into the "Microphone" input.

3. Move the record lock button (27) downward with the left hand. This releases the safety lock which prevents accidental erasure.

4. Depress the "Record" button with the right hand (while holding record lock button (27) with the left hand) until it latches.

5. Adjust the "Volume" control until the "Normal" indicator just flashes, while speaking into the microphone. When the "Volume" control is advanced too far the "Overload" indicator will flash and the recording will be distorted. To prevent overload, lower the "Volume" control to a point where the "Overload" indicator will not flash.

6. The "Tone" control does not operate during recording. When recording from radio, set the radio "Tone" control for maximum treble.

To Record From External Radio, TV, Or Phonograph-

1. Insert the phonograph pickup plug into the "Radio-P. A. -Phono" jack.

2. For radio or TV recording, connect patch cord, part No. C20. 233 to the voice coil of the radio or TV receiver speaker by means of the alligator clips. Plug into "Radio-P. A. -Phono" jack.

3. Proceed as described under "To Record From Microphone".

NOTE: Remove patch cord after recording is completed.

To Use Second Track-

1. Depress the "Stop" button when all the tape has wound onto the take-up reel.

2. Remove reel containing tape and place on left-hand supply pan.

3. Place empty reel on right-hand take-up pan.

4. Thread tape as previously described.

To Play Recordings-

1. Turn on unit with "Volume" control knob.

2. Thread tape as described under "Threading The Tape."

3. Set the speed change knob (1) to the speed at which the recording was made.

4. Depress "Play" button until it latches.

5. Adjust "Volume" and "Tone" controls to desired listening level.

High-Speed Forward Or Reverse-

When it is desirable to play a certain portion of the tape over again it is not necessary to rewind the entire tape. By depressing the 'Forward' or 'Reverse" button the tape will advance (or reverse) at a rapid speed.

Several minutes of normal recording can be skipped in a few seconds by the "Reverse" and "Forward" buttons.

Tape Timer-

If, when making recordings or playing a recorded tape, you wish to play back a certain recording, note the reading on the timer scale when the particular recording is being made or heard. Rewind the tape until the number you have noted appears on the scale, press "Stop" button, then press "Play" button and you are now listening to the recording you wanted.

When starting a new reel of tape or re-recording a reel, reset the indicator pointer to "O" by rotating the reset knob. By starting at "O" on all tapes, the number location can be cataloged for each selection on any reel.

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excessive width.

Erasing Recorded Material-

When the record button is depressed, the erase head is automatically positioned, erasing any previous recording before a new one is made. You may erase material no longer needed, without recording, by depressing the "Record" button and turning the "Volume" control knob to the minimum volume position or extreme counter-clockwise position just before the recorder shuts off. One track is erased at a time. To erase the second track, reverse the reels and repeat the above operation.

To Use Recorder As A Public Address System-

Insert the microphone plug into the "Microphone" input jack. Plug in an extension speaker or speakers if desired and depress the "Record" button. Set the "Volume" and "Tone" controls to the desired listening level. A recording can be made at the same time with a tape placed on the unit in the normal manner.

CAUTION: When using the public address feature, see that the microphone is as far away from the speakers as possible, to prevent "feedback" squeal.

Remote Control Operation-

A socket and switch are provided to allow remote operation up to a distance of 18 feet, either recording or playback. This is accomplished by means of a remote control cable (Mod. No. HC-12). Connect attachment cord as follows:

1. Insert remote control cable plug into remote socket. Be sure remote control switch on end of cable is in "Standby" position.

2. With control switch on the recorder in "Normal" position start the unit in the regular manner and set "Volume" control to the proper level.

3. Place control switch on the set to "Remote" position. Tape will come to a stop.

The recorder can now be operated (start and stop) by means of the remote cable switch. When starting the recorder by means of the remote control, the switch should be rotated to the "Motor" position and then after a slight pause rotated to the "Record-Play" position. To stop recording or playback, rotate the control switch directly to "Standby" position, pausing slightly at the "Motor" position.

ADJUSTMENTS

Disassembly Instructions-

1. Remove two Phillips head screws from rear of case.

2. Remove two Phillips head screws which hold "Normal-Remote" switch to mounting bracket.

3. Remove three Phillips head wood screws which hold "Normal-Remote" mounting bracket in case. Remove bracket from case.

4. Remove push-on type "Volume" and "Tone" control knobs.

5. Remove two screws located under "Volume" and "Tone" control knobs. Remove escutcheon.

6. Remove two hex head screws located under escutcheon.

7. Lift unit out of case, removing leads from speaker before removing unit completely.

Record-Play Head Adjustment-
(See Exploded View)-

To adjust the record-play head (60) for maximum frequency response, make the following adjustment:

1. Remove the rear escutcheon (6) and rear escutheon plate (26).

2. Properly thread an alignment tape or a good recorded tape on the machine.

3. Set the controls as described under "To Play Recordings".

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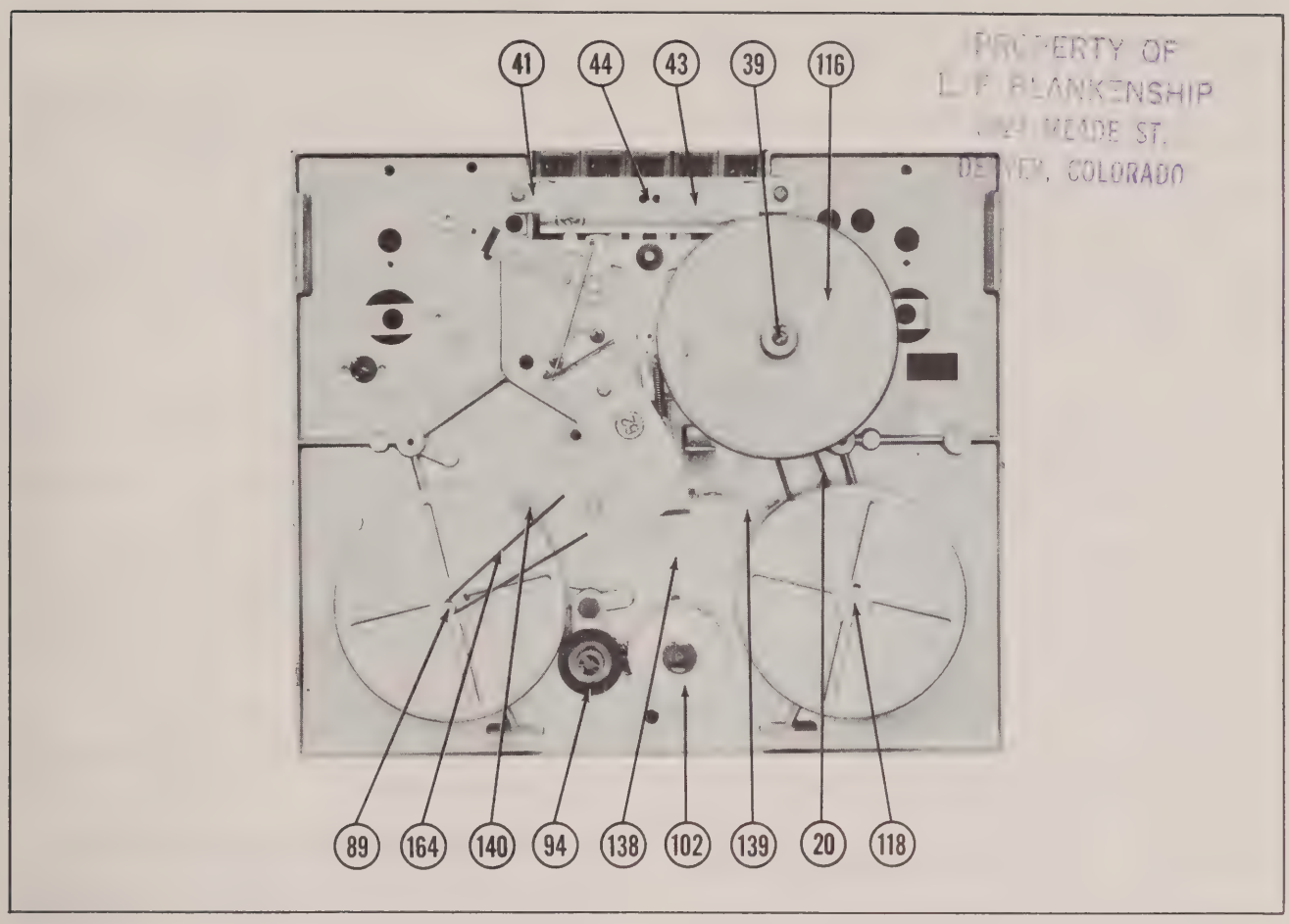

Figure 4

Grip the vertical portion of the record head mounting bracket with a pair of long-nosed pliers. Rock the mounting bracket and record head from side to side slightly until the maximum high frequencies are obtained. Bend the bracket with the pliers to obtain a permanent set at this position.

Pressure Pad Adjustment-
(See Exploded View)-

1. Remove the front escutcheon (10).

2. Depress the "Play" button. Do not turn the recorder on.

3. Use a pencil type postal scale and check the amount of pressure necessary to just pull the pad away from the tape. The test should be made on the end of the pressure pad mounting spring (65). Adjust the pressure pad for 1 3/4 oz. $\pm$1/4 oz. pressure.

(a) The record head pressure pad is adjusted by the locked adjustment screw (54).

(b) The guide post pressure pad (53) is adjusted by bending the pressure pad spring. It must be adjusted for minimum pressure against the tape.

4. After the adjustments are made depress the "Stop" button and replace the front escutcheon.

Erase Head Adjustment-

1. With tape properly threaded, turn recorder on and depress the "Record" button. Allow tape to run for a few seconds then turn recorder off, but leave "Record" button depressed.

2. With the escutcheons removed check the erase head (57) to see if it is parallel with the tape.

3. Check to see if the top edge of the tape coincides with the top end of the diagonal slot in the erase head (junction of long diagonal slot and short vertical slot). To adjust level of tape, loosen set screw (47), see exploded view, and rotate tape guide post (48) to move tape up or down. Tighten set screw (47).

4. After this adjustment has been made, check to see if the tape moves forward approximately 1/64" when the "Record" button is depressed. If not, loosen the forward adjustment screw (119), see Figure 2, and turn the screw in or out as required to obtain this 1/64" movement. Tighten the lock nut.

Brake Shoe Adjustment-

1. In order to adjust the brake shoes, the complete mechanism must be removed from the carrying case and the speaker disconnected.

2. With all push buttons in the up position the brake shoes (140) should clear the drums by approximately 1/8".

3. Depress the "Stop" button while observing the brake shoes. Both brake shoes must contact the drums at the same time and with equal pressure.

4. The adjustment is accomplished by bending the spring arm (139).

Adjustment For Slow Take-Up Reel-

There are some instances where the spring drive belt (20), see Figures No. 2 and No. 6A, stretches after a period of time. When this happens, the takeup torque will be insufficient to wind tape properly onto the take-up reel. In this case, the belt should be replaced as follows:

Remove rear escutcheon (6) and rear escutcheon plate (26). Remove take-up reel pan (18). With the "Stop" button depressed, remove old spring drive belt from around pressure roller (70) and lift belt clear of recorder. Install new belt by reversing the above procedure.

Bias Adjustment-Model 4B10 and 4F10-

Turn the recorder on and depress the "Record" button; use no tape. To determine if the bias is within satisfactory limits without dismantling the unit, merely connect a VTVM from the top lug of the recording head to chassis. If 75 to 100 volts are present no adjustment is necessary.

If the readings are outside of this range, proceed as follows:

(Model 4B10) 1. Try a new 5879, 12AX7, 6AQ5, and 6X4.

2. If still not within range, remove the chassis shield and connect a low capacity VTVM from test point "A" to chassis and adjust trimmer M4 to obtain a reading of 2.25 volts.

(Model 4F10) 1. Try a new 12AY7, 12AX7, 6AQ5, and 5Y3.

2. If still not within range, remove the chassis shield and connect a low capacity VTVM from test point "A" to chassis. Use low scale. Adjust trimmer M7 for maximum reading. Adjust trimmer M4 to obtain a reading of 2.25 volts. This provides the optimum in performance.

Neon Record Level Indicators-Model 4B10 and 4F10-

The neon record indicator firing level adjustment is only required if a neon bulb is replaced. The two neon indicators are adjusted for correct firing level by means of two trimmer capacitors, one for each indicator.

To adjust indicators proceed as follows:

1. Turn recorder on and depress "Record" button.

2. Connect a short jumper lead across the bias oscillator coil, L1 (short out the coil to disable the oscillator.)

3. Connect an audio oscillator, set at 1000 cycles, into the microphone input jack. Output of audio oscillator should be approximately .01 volt. (A 1 volt output level may be used with a 100 to 1 reduction pad of resistors inserted between the audio oscillator and the microphone jack).

(Model 4B10) Connect probe of low capacity type AC VTVM to test point "B" (junction) of two 330KΩ resistors, R22 and R23, mounted on a terminal strip near the volume control).

(Model 4F10) Connect probe of low capacity type AC VTVM to test point "B" (junction of two 330KΩ resistors, R28 and R29, mounted on a terminal strip near the volume control).

5. Adjust volume control to obtain a reading of 36 volts on VTVM and leave control set and VTVM connected.

6. Disconnect shorting jumper from across bias oscillator coil.

7. Adjust "Normal" indicator trimmer M5A fully clockwise and then turn slowly counterclockwise so that upon loosening the trimmer the "Normal" bulb barely lights. This adjustment must be made loosening the trimmer.

8. Short out the bias oscillator coil.

9. Increase volume control to obtain a reading of 88 volts on the VTVM.

10. Remove short from bias oscillator coil.

11. Adjust "Overload" indicator trimmer M5B as described in step "7", for just barely lighting the "Overload" indicator bulb.

IMPORTANT: Do not readjust the recording bias oscillator after setting the indicator light adjustments.

TROUBLES

Push Buttons Fail To Latch Into Position-

1. Lock plate spring (44) loose or broken, resulting in the lock plate not being held against the hinge bracket (41).

Fails To Erase-

1. Spring (52) loose or broken, resulting in the erase head (57) not being pulled forward to engage the tape.

2. Erase head not aligned properly. See "Erase Head Adjustment".

No Fast Forward Or Reverse-

1. Idler lever tension spring (78) may be loose or broken; if so, idler lever (138) will not be actuated.

2. Check idler drive belt (103) to see if it is properly connected.

No Drive On Record Or Playback-

1. Idler tension spring (154 or 160) loose or broken, thereby not holding idler wheel (144) in engagement with motor pulley (147) and flywheel (116).

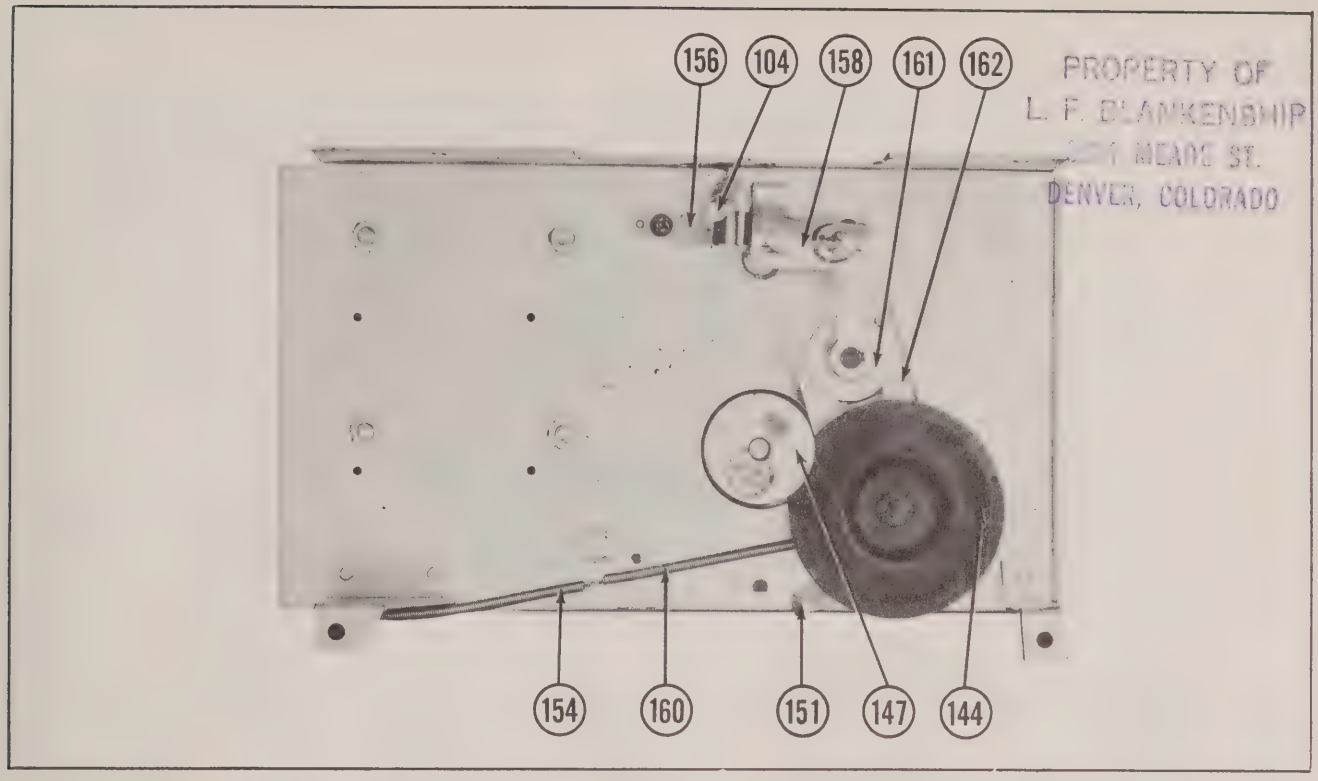

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Figure 5

2. Idler slide plate (162) binding on slide bushing (161), thus preventing idler wheel (144) from moving forward.

Tape Fails To Wind On Take-Up Reel During Record Or Playback-

1. Reel drive spring (20) loose or broken. See "Adjustment For Slow Take-Up Reel".

2. Brake drum shaft (118) binding. Clean foreign matter from bearing surface.

Speed Variation Or "Wow"-

1. Check the capstan (39), pinch roller (70), idler wheel (144), motor pulley (147), and flywheel (116) for oil or foreign material on their driving surfaces. Clean these parts with a good cleaning fluid.

2. Check motor pulley (147) to see if it is secured to motor shaft.

3. Check idler tension spring (154 and 160); see if they are holding idler wheel (144) in firm contact with motor pulley (147) and flywheel (116).

4. Idler slide plate (162) binding on slide bushing (161) preventing idler wheel (144) from making positive contact with the motor pulley and flywheel.

Tape Overruns Or Spills When Stop Button Is Depressed During Fast Forward Or Rewind-

1. Brake shoes out of adjustment. See "Brake Shoe Adjustment".

2. Brake pads worn out. Replace pads.

Fails To Record-

1. Tape pressure pad not adjusted properly, resulting in the tape not being held against the recording head. See "Pressure Pad Adjustment".

2. Record head (60) loose on its mounting. Adjust head and tighten into position as described under "Record-Play Head Adjustment".

3. Check the recording tape to see if the dull-coated side faces inward on the reel. If the dull side faces outward a recording cannot be made.

CLEANING

The record head (60), capstan (39), and pressure roller (70) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. Use a soft cloth and alcohol to clean the head surfaces, capstan and pressure roller.

CAUTION: Do not use a brush or any metal object when cleaning the recording head as this could mar the metal pole piece.

LUBRICATION

All rotating parts are provided with generous size oilite bearings, which are factory lubricated and require no further attention.

An occasional cleaning out of foreign matter under the plastic pushbutton cover is desirable, and a small drop of oil on the sliding lever members is advisable.

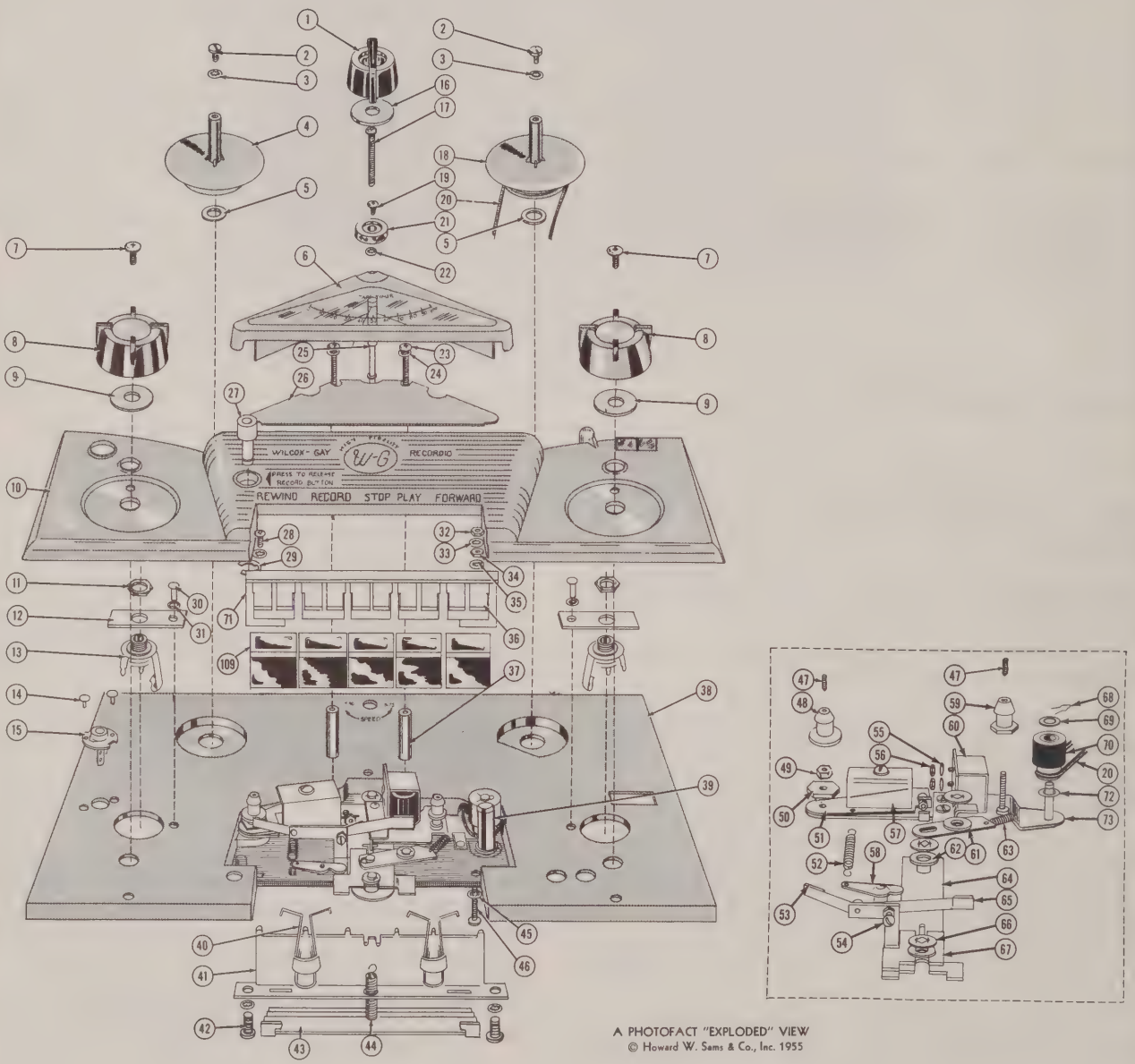
WILCOX-GAY
RECORDIO
PRESS TO RELEASE RECORD BUTTON
REWIND RECORD STOP PLAY FORWARD
A PHOTOFACT "EXPLODED" VIEW
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Figure 6A. Exploded View Of Parts Above Baseplate

PROPERTY OF
F. BLANKENSHIP
3321 MEADE ST.
DENVER, COLORADO

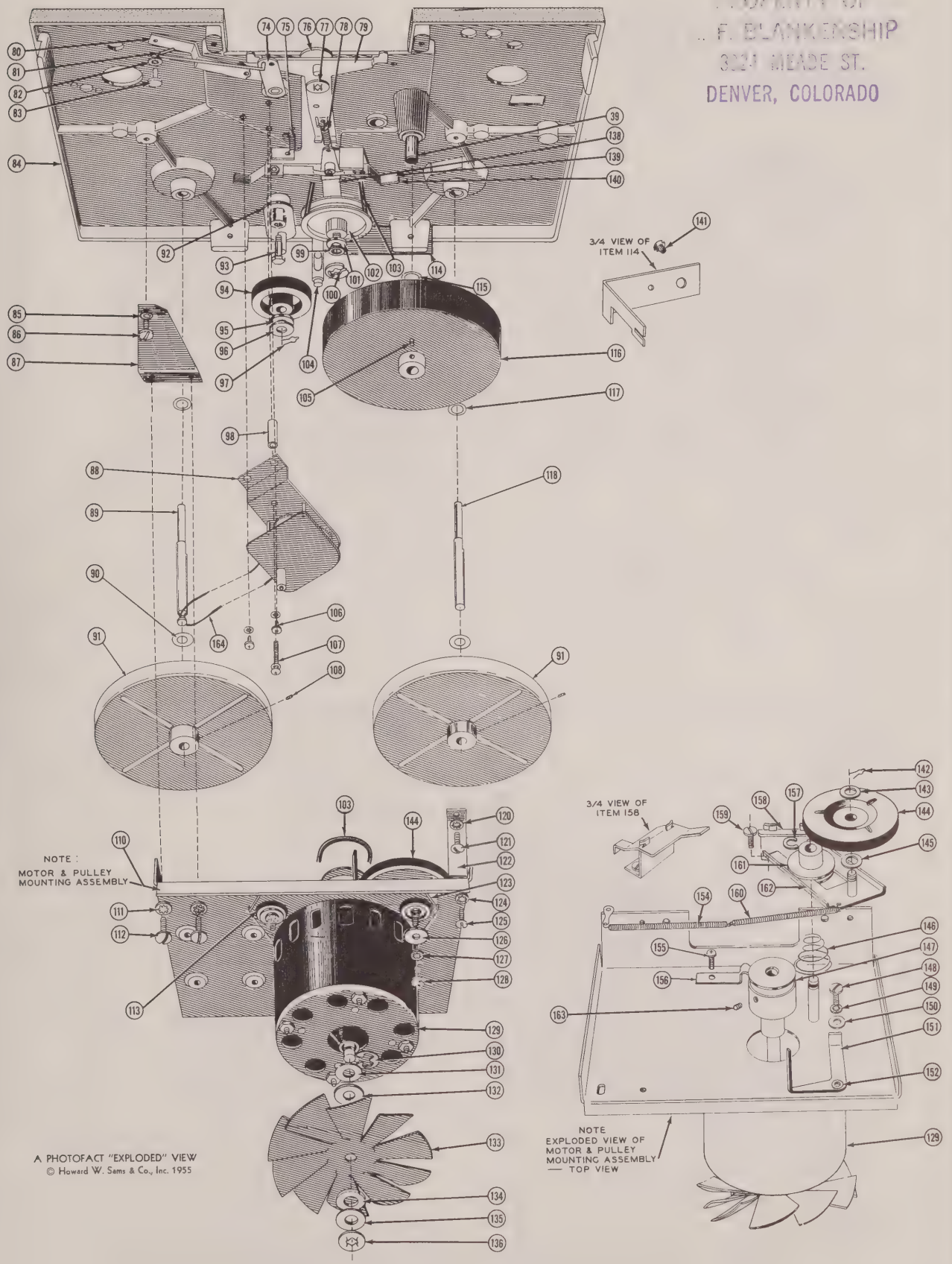
3/4 VIEW OF ITEM 114
NOTE :
MOTOR & PULLEY MOUNTING ASSEMBLY
3/4 VIEW OF ITEM 158
NOTE
EXPLODED VIEW OF MOTOR & PULLEY MOUNTING ASSEMBLY — TOP VIEW
A PHOTOFACT "EXPLODED" VIEW
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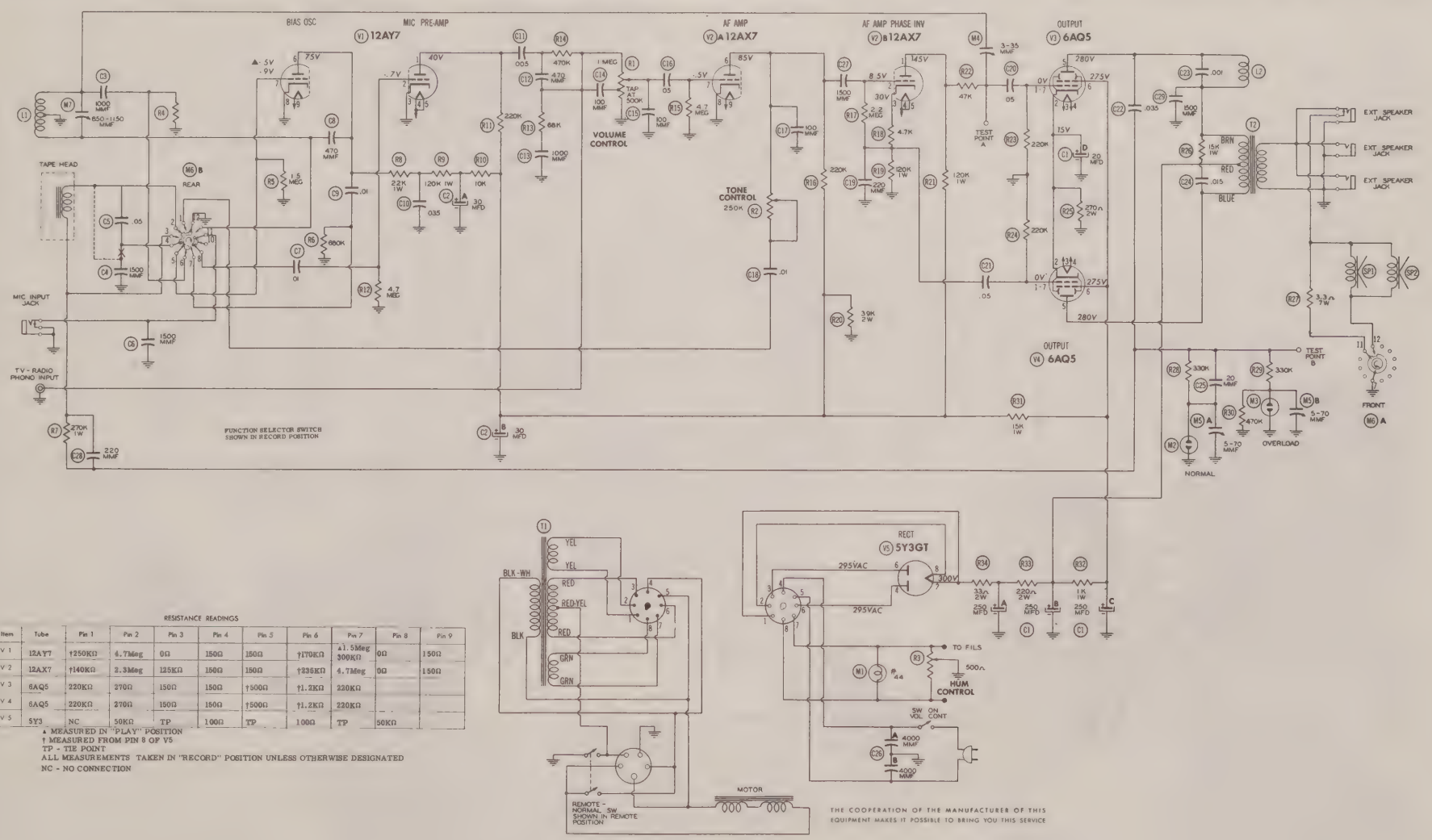
Figure 6B. Exploded View Of Parts Below Baseplate



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AY7	†250KΩ	4.7Meg	0Ω	150Ω	150Ω	†170KΩ	▲1.5Meg 300KΩ	0Ω	150Ω
V 2	12AX7	†140KΩ	2.3Meg	125KΩ	150Ω	150Ω	†235KΩ	4.7Meg	0Ω	150Ω
V 3	6AQ5	220KΩ	270Ω	150Ω	150Ω	†500Ω	†1.2KΩ	220KΩ		
V 4	6AQ5	220KΩ	270Ω	150Ω	150Ω	†500Ω	†1.2KΩ	220KΩ		
V 5	5Y3	NC	50KΩ	TP	100Ω	TP	100Ω	TP	50KΩ	

▲ MEASURED IN "PLAY" POSITION
† MEASURED FROM PIN 8 OF V5
TP - TIE POINT
ALL MEASUREMENTS TAKEN IN "RECORD" POSITION UNLESS OTHERWISE DESIGNATED
NC - NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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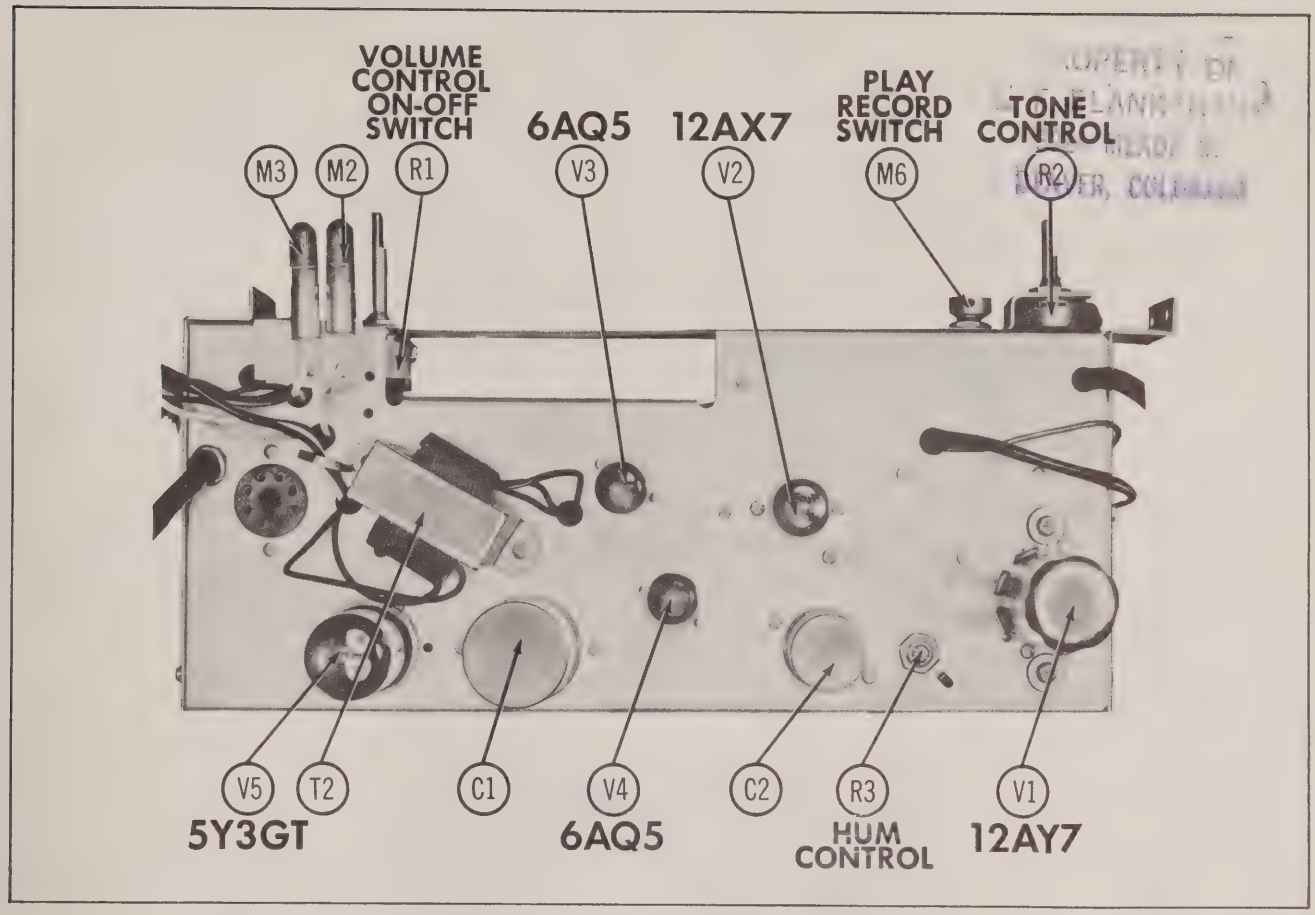
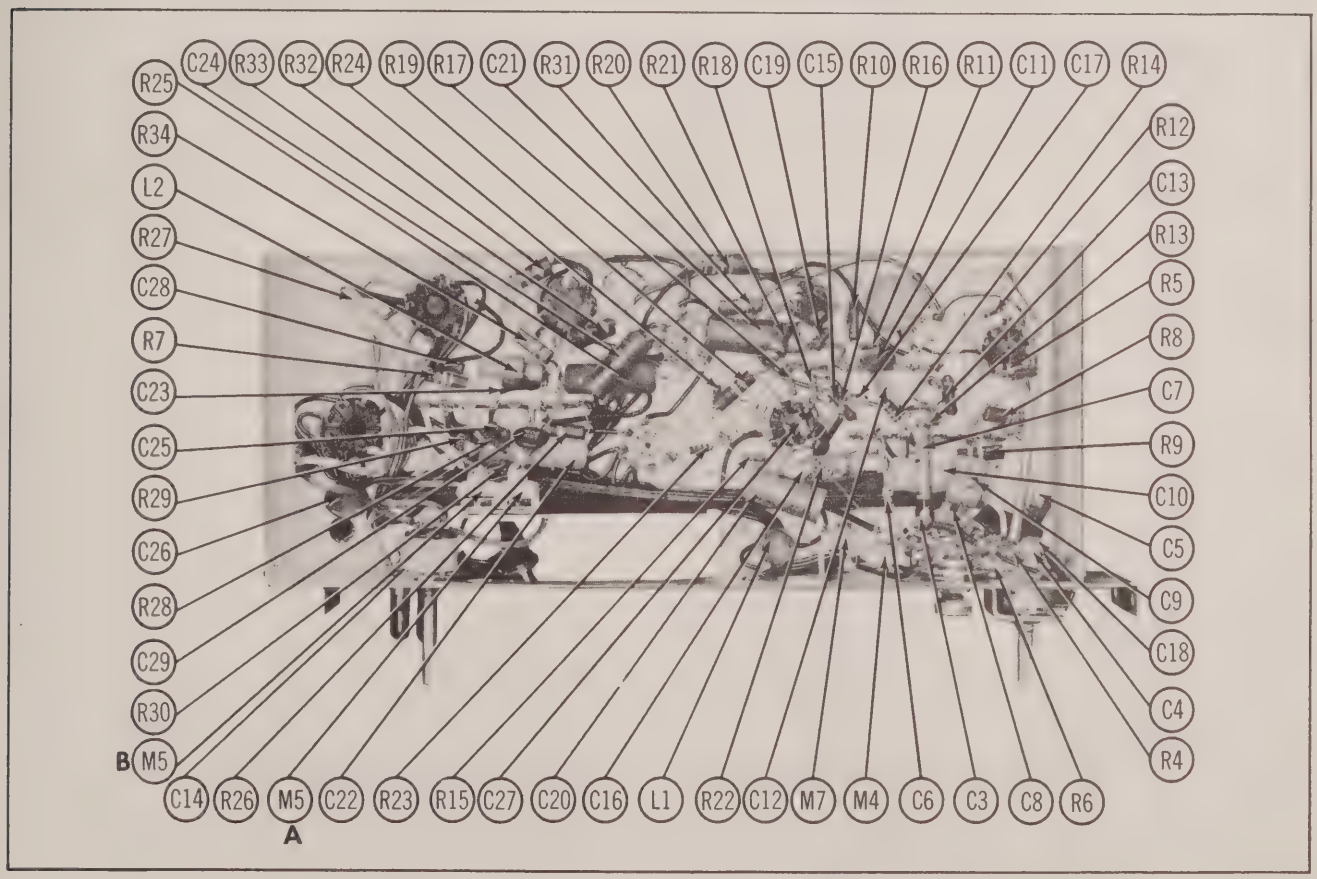
THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

280-12

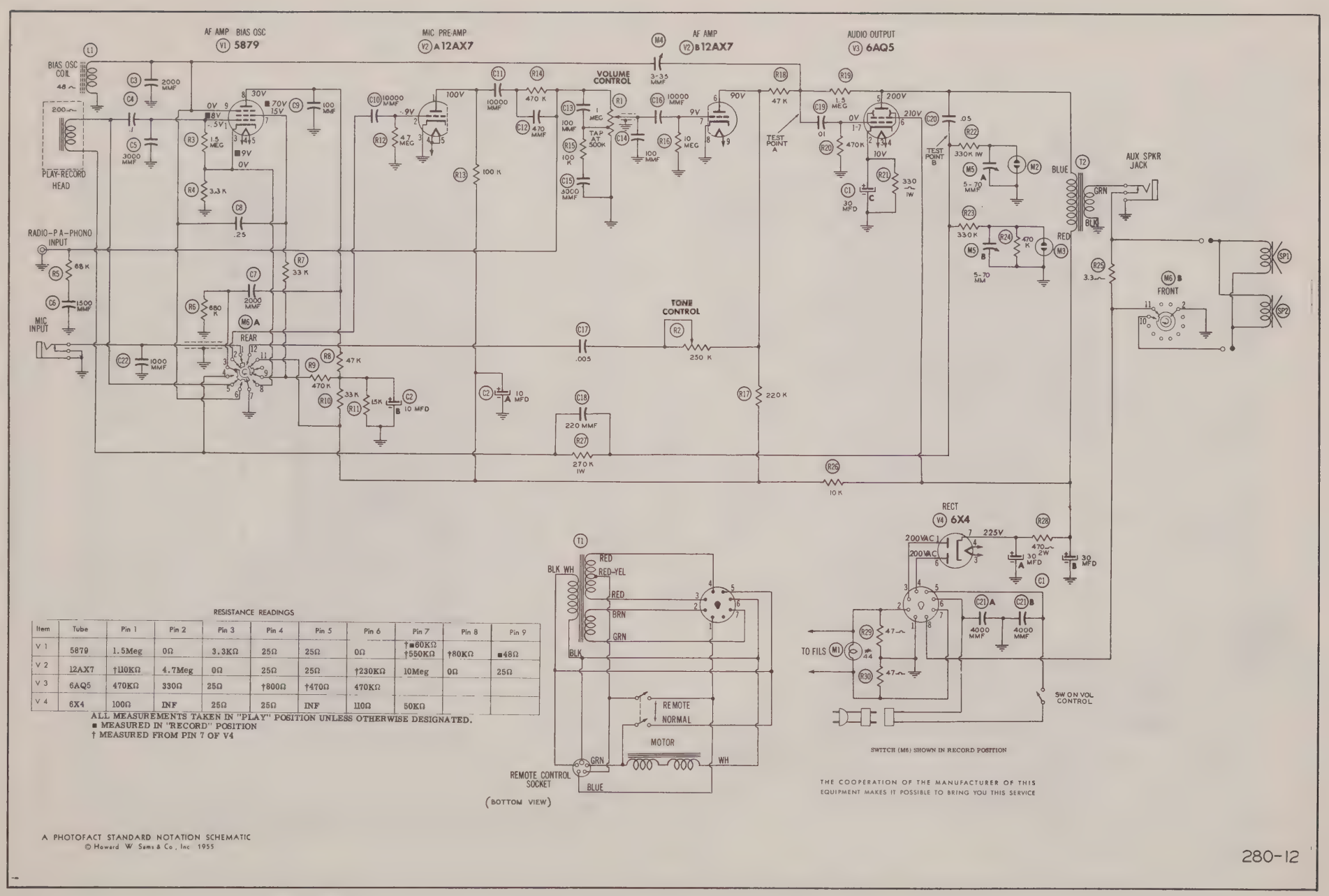
Schematic Diagram Of Model 4F10



Top View Of Model 4F10 Amp. Chassis



Bottom View Of Model 4F10 Amp. Chassis



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	1.5Meg	0Ω	3.3KΩ	25Ω	25Ω	0Ω	†■80KΩ †550KΩ	†80KΩ	■48Ω
V 2	12AX7	†110KΩ	4.7Meg	0Ω	25Ω	25Ω	†230KΩ	10Meg	0Ω	25Ω
V 3	6AQ5	470KΩ	330Ω	25Ω	†800Ω	†470Ω	470KΩ			
V 4	6X4	100Ω	INF	25Ω	25Ω	INF	110Ω	50KΩ		

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.
■ MEASURED IN "RECORD" POSITION
† MEASURED FROM PIN 7 OF V4

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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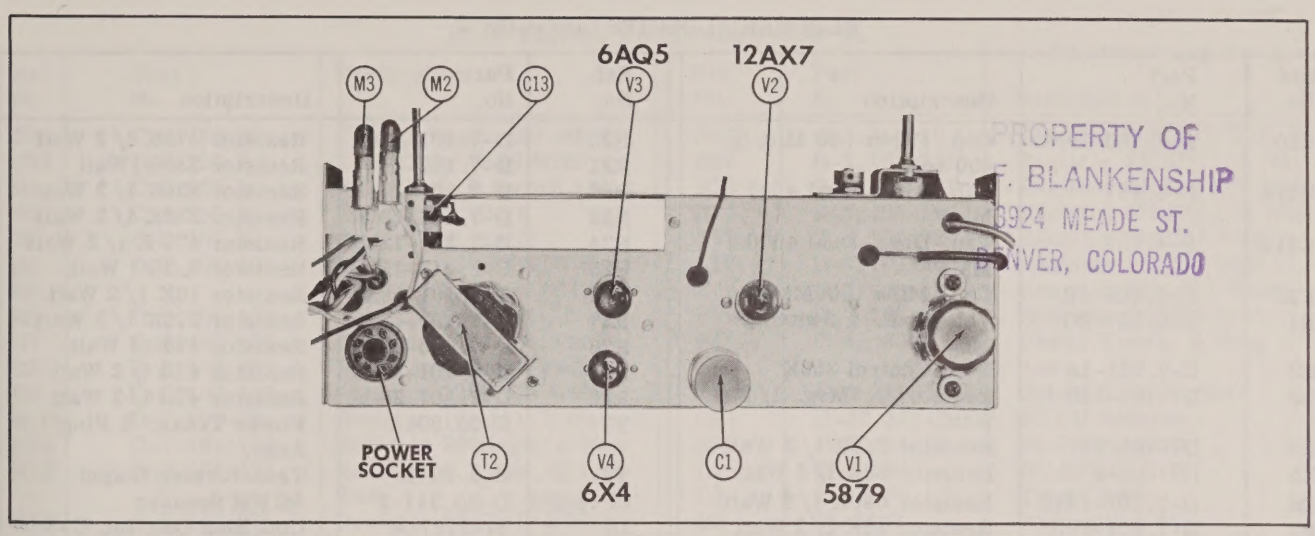
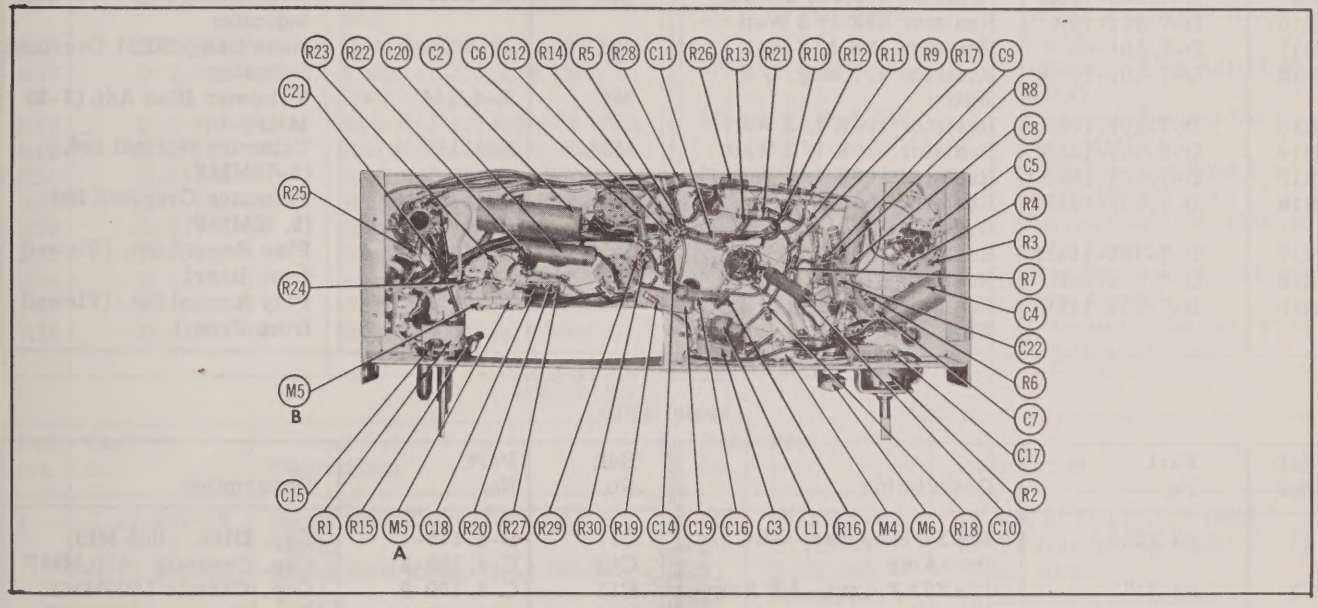
Schematic Diagram Of Model 4B10



PROPERTY OF
F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

Top View Of Model 4B10 Amp. Chassis



Bottom View Of Model 4B10 Amp. Chassis

ELECTRICAL PARTS LIST
Model 4B10

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	69-2222	5879AF Amp. -Bias Osc.	C5	C-4.109-31R	Cap. Ceramic 3000MMF
V2	69-2175	12AX7 Mic., Pre-Amp., AF Amp.	C6	C-4.109-13R	Cap. Ceramic 1500 MMF
V3	69-2171	6AQ5 Audio. Output	C7	D-3.100-2	Cap. Paper .002 Mfd. @ 600 volts
V4	69-2172	6X4 Rectifier	C8	D-3.100-30N	Cap. Paper .25 Mfd. @ 200 volts
C1A	B-5.437B	Elect. Cap. 30 Mfd. @ 250 volts	C9	C-4.109-10R	Cap. Ceramic 100 MMF
C1B		Elect. Cap. 30Mfd. @ 250 volts	C10	C-4.109-33R	Cap. Ceramic 10000MMF
C1C		Elect. Cap. 30 Mfd. @ 25 volts	C11	C-4.109-33	Cap. Ceramic 10000MMF
C2A	B-5.444	Elect. Cap. 10 Mfd. @ 200 volts	C12	C-4.109-29	Cap. Ceramic 470MMF
C2B		Elect. Cap. 10 Mfd. @ 200 volts	C13	C-4.109-10R	Cap. Ceramic 100 MMF
C3	D-4.105-56C	Cap. Mica 2000MMF	C14	C-4.109-10R	Cap. Ceramic 100 MMF
C4	D-3.100-22N	Cap. Paper .1 Mfd. @ 600 volts	C15	C-4.109-31	Cap. Ceramic 3000MMF
			C16	C-4.109-33R	Cap. Ceramic 10000MMF
			C17	D-3.100-4N	Cap. Paper .005 Mfd. @ 600 volts
			C18	C-4.109-27R	Cap. Ceramic 220 MMF
			C19	D-3.100-7N	Cap. Paper .01 Mfd. @ 400 volts

ELECTRICAL PARTS LIST-CON'T.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C20	D-3.100-19N	Cap. Paper .05 Mfd. @ 400 volts	R20	D-7.101-128R	Resistor 470K 1/2 Watt
			R21	D-7.102-2R	Resistor 330Ω 1Watt
C21A	B-4.131	Cap. Disc. Dual 4000 MMF	R22	D-7.101-121R	Resistor 330K 1/2 Watt
			R23	D-7.101-121R	Resistor 330K 1/2 Watt
C21B	B-4.131	Cap. Disc. Dual 4000 MMF	R24	D-7.101-128R	Resistor 470 K 1/2 Watt
			R25	C-6.212-1B	Resistor 3.3Ω 1 Watt
C22	C-4.109-9R	Cap. Mica 1000MMF	R26	D-7.101-58R	Resistor 10K 1/2 Watt
R1	C-8.227-2G	Vol. Cont. & Switch 1 Meg.	R27	D-7.102-126	Resistor 270K 1/2 Watt
			R28	D-7.103-72C	Resistor 470Ω 2 Watt
R2	C-8.231-1A	Tone Control 250K	R29	D-7.101-250R	Resistor 47Ω 1/2 Watt
R3	D7-101-148	Resistor 1.5Meg. 1/2 Watt	R30	D-7.101-250R	Resistor 47Ω 1/2 Watt
			T1	C-35.804A	Power Trans. & Plug Assy.
R4	D7-101-37	Resistor 3.3K 1/2 Watt			
R5	D7-101-93R	Resistor 68K 1/2 Watt	T2	C-9.264E	Transformer, Output
R6	D-7.101-134R	Resistor 680K 1/2 Watt	SP1&SP2	D-30.341-2	8Ω PM Speaker
R7	D-7.101-79R	Resistor 33K 1/2 Watt	L1	17-3137-A	Coil, Bias Osc. Inc. C-3
R8	53.2834	Resistor 47K 1/2 Watt	M1	45-2003	Pilot Lamp #44
R9	D-7.101-128R	Resistor 470K 1/2 Watt	M2	45-2036-0	Neon Lamp NE51 Normal Indicator
R10	D-7.101-79R	Resistor 33K 1/2 Watt			
R11	D-7.101-65	Resistor 15K 1/2 Watt	M3	45-2036-0	Neon Lamp NE51 Overload Indicator
R12	D-7-101-178R	Resistor 4.7 Meg. 1/2 Watt	M4	B-4.144	Trimmer Bias Adj. (3-35 MMF)
R13	D-7-101-100R	Resistor 100K 1/2 Watt			
R14	D-7-101-128R	Resistor 470K 1/2 Watt	M5A	B-4.145	Trimmer Normal Ind. (5-70MMF)
R15	D-7.101-100R	Resistor 100K 1/2 Watt			
R16	D-7.101-192R	Resistor 10Meg. 1/2 Watt	M5B	B-4.145	Trimmer Overload Ind. (5.70MMF)
			M6A	B-11.230F	Play Record Sw. (Viewed from Rear)
R17	D-7-101-114R	Resistor 220K 1/2 Watt			
R18	D-7.101-86R	Resistor 47K 1/2 Watt	M6B		Play Record Sw. (Viewed from Front)
R19	D-7.101-148R	Resistor 1.5Meg. 1/2 Watt			

ELECTRICAL PARTS LIST

Model 4F10

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	69-2224	12AY7 Bias Osc. -Mic. Pre-Amp	C11	B-4.115-1	Cap. Disc. .005 Mfd.
			C12	C-4.109-2	Cap. Ceramic 470 MMF
V2	69-2175	12AX7AF Amp. -AF Amp. Phase Inv.	C13	C-4.109-9	Cap. Cermic 1000MMF
			C14	C-4.109-10	Cap. Ceramic 100MMF
V3	69-2171	6AQ5 Output	C15	C-4.109-10	Cap. Ceramic 100MMF
V4	69-2171	6AQ5 Output	C16	D-3.100-18	Cap. Paper .05 Mfd. @ 200 volts
V5	69-2227	5Y3 Rectifier			
C1A	C-5.421-7	Elect. 250 Mfd. @450 volts	C17	C-4.109-10	Cap. Ceramic 100MMF
			C18	D-3.100-7	Cap. Paper .01 Mfd. @ 400 volts
C1B		Elect. 250 Mfd. @450 volts			
			C19	C-4.109-27	Cap. Ceramic 220 MMF
C1C		Elect. 250 Mfd. @450 volts	C20	D-3.100-19	Cap. Paper .05 Mfd. @ 400 volts
C1D		Elect. 20 Mfd. @25 volts	C21	D-3.100-19	Cap. Paper .05 Mfd. @ 400 volts
C2A	B-5.437	Elect. 30 Mfd. @250 volts	C22	D-3.100-46	Cap. Paper .035 Mfd. @ 600 volts
C2B		Elect. 30 Mfd. @250 volts	C23	D-4.104-88	Cap. Mica .001 Mfd. @ 500 volts
C3	C-4.109-9	Cap. Ceramic 1000MMF			
C4	C-4.109-13	Cap. Ceramic 1500 MMF	C24	D-3.100-58	Cap. Paper .015 Mfd. @ 600 volts
C5	D-3.100-18	Cap. Paper .05 Mfd. @ 200 volts	C25	C-4.109-34	Cap. Ceramic 20 MMF @ 500 volts
C6	C-4.109-13	Cap. Ceramic 1500 MMF			
C7	C-4.109-33	Cap. Ceramic .01 Mfd. @ 500 volts	C26A	B-4.131	Cap. Disc. Dual 4000 MMF
C8	C-4.109-2	Cap. Ceramic 470 MMF	C26B	B-4.131	Cap. Disc. Dual 4000 MMF
C9	C-4.109-33	Cap. Ceramic .01 Mfd. @500 volts	C27	C-4.109-13	Cap. Ceramic 1500 MMF
C10	D-3.100-46	Cap. Paper .035 Mfd. @ 600 volts			

PROPERTY OF
E. BLANKENSHIP
DENVER, COLORADO

ELECTRICAL PARTS LIST-CON'T.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C28	C-4.109-27	Cap. Ceramic 220 MMF	R27	C-6.215-10	Resistor 3.3KΩ@ 7 Watt
C29	B-4.129-7	Cap. Disc. 1500 MMF	R28	D-7.101-121	Resistor 330K@1/2 Watt
R1	C-8.227-2	Vol. Cont. & Switch 1Meg	R29	D-7.101-121	Resistor 330K@1/2 Watt
R2	C-8.231-1	Tone Cont. 250 K	R30	D-7.101-128	Resistor 470K@1/2 Watt
R3	C-8.207-7	Hum. Cont. 500Ω	R31	D-7.102-72	Resistor 15K@1 Watt
R4	D-7.101-121	Resistor 330K@1/2 W.	R32	D-7.102-23	Resistor 1 K@1 Watt
R5		Resistor 1.5Meg. @1/2W.	R33	D-7.103-58	Resistor 220Ω@2 Watt
R6	D-7.101-134	Resistor 680 K@1/2 W.	R34	D-7.103-23	Resistor 33Ω@2 Watt
R7	D-7.102-126	Resistor 270K@1 Watt	T1	C-35.804A	Power Trans. & Plug Assy.
R8	D-7.102-80	Resistor 22K@1 Watt			
R9	D-7.102-112	Resistor 120K@1 Watt.	T2	C-9.261C	Output Transformer
R10	D-7.101-58	Resistor 10K@1/2 Watt	SP1	D-30.341-2	8Ω PM Speaker
R11	D-7.101-114	Resistor 220K@1/2 Watt	SP2	D-30.341-2	8Ω PM Speaker
R12	D-7.101-178	Resistor 4.7 Meg. @1/2 Watt	L1	B-1.557	Bias Osc. Coil
			L2	B-1.556	Tone Choke
R13	D-7.101-93	Resistor 68K@1/2 Watt	M1	45-2003	Pilot Lamp #44
R14	D-7.101-128	Resistor 470 K@1/2 Watt	M2	45-2036-0	Neon Lamp NE51 (Normal Ind.)
R15	D-7.101-178	Resistor 4.7 Meg. @1/2 Watt	M3	45-2036-0	Neon Lamp NE51 (Overload Ind.)
R16	D-7.101-114	Resistor 220K@1/2 Watt			
R17	D-7.101-155	Resistor 2.2 Meg. @1/2 Watt	M4	C-4.142A	Trimmer Bias Adj. (3-35 MMF)
R18	D-7.101-44	Resistor 4.7K@1/2 Watt	M5A	B-4.140	Trimmer Normal Ind. (5-70MMF)
R19	D-7.102-112	Resistor 120K@1 Watt			
R20	D-7.103-153	Resistor 39K@2 Watt	M5B		Trimmer Overload Ind. (5-70-MMF)
R21	D-7.102-112	Resistor 120K@1 Watt			
R22	D-7.101-86	Resistor 47K@1/2 Watt	M6A		Play-Record Sw. (Viewed from Rear)
R23	D-7.101-114	Resistor 220K@1/2 Watt			
R24	D-7.101-114	Resistor 220K@1/2 Watt	M6B		Play-Record Sw. (Viewed from Front)
R25	53-2825	Resistor 270Ω@2 Watt			
R26	D-7.102-72	Resistor 15K@1 Watt	M7	C-4.142A	Trimmer, Bias Osc. Freq. Adj. (850-1150MMF)

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	C-13.253-5E	Speed Shift Knob, Blue (Model 4B10)	19	57-3678-1	#4-40x 5/16 Phillips OHMS
			20	B-31.351	Reel Drive Spring (Belt)
	C-13.253-4E	Speed Shift Knob, Gray (Model 4F10)	21	B-32.302	Timer Knob
			22	73-2231-3	#4 Internal Lockwasher
2	57-2049-4	Screw, #6-32x1/4 BHMS	23	57-2552-1	#6-32x 1 1/4 Phillips RHMS
3	73-2334-1	#6 Cantlink Washer	24	73-2334-1	#6 Cantlink Washer
4	B-13.261-6G	Reel Pan For Feed Reel, Blue (Model 4B10)	25	35-851	Timer Shaft and Pointer Assy.
26	B-19.975-4B	Rear Escutcheon Plate, Blue (Model 4B10)			
	B-13.261-1	Reel Pan For Feed Reel, Gray (Model 4F10)		B-19.975-3B	Rear Escutcheon Plate, Gray (Model 4F10)
5	B-28.163	Linen Washer			
6	D-13.292-2F	Rear Escutcheon, Silver	27	B-32.308-1	Record Lock Button
7	57-3445-1	#8-32x3/8 Phillips RHMS	28	57-2109-2	#6-32x 3/16 BHMS Brz. Phillips
8	C-13.254-8E	Tone Control Knob, Blue (Model 4B10)	29	33.415	"E" Ring Retainer
			30	54-2030-35	Drilled Rivet 1/4x.122x7/32
	C-13.254-7E	Tone Control Knob, Gray (Model 4F10)	31	73-2231-5	#8 Int. Lockwasher
			32	48-410-1	#6-32 Hex. Nut
9	73-2254-3	Felt Washer	33	73-2234-3	#6 Ext. Lockwasher
10	E-13.293-3F	Front Escutcheon	34	48-410-1	#6-32 Hex. Nut
11	48-2213-1	Hex. Nut, 3/8-32x1/2	35	73-2234-3	#6 Ext. Lockwasher
12	B-19.985-1A	Bracket for Input Jack	36	B-19.876D	Push Button Lever
13	B-33.453	Midget Jack	37	B-33.446	Spacer
14	54-2030-35	Drilled Rivet 1/4x.122x7/32	38	D-35.807-7F	Base Plate Assy., Blue (Model 4B10)
15	B-33.370	Phono Jack			
16	73-2254-3	Felt Washer		D-35.807-6F	Base Plate Assy., Gray (Model 4F10)
17	57-2552-2	Screw, 6-32x1 1/4 Phillips RHMS			
18	B-13.262-6H	Reel Pan for Take-Up Reel, Blue (Model 4B10)	39	B-32.259F	Capstan Shaft
	B-13.262-1	Reel Pan for Take-Up Reel, Gray (Model 4F10)			

MECHANICAL PARTS LIST- CON 'T.

Ref. No.	Part No.	Description
40	B-31.337B	Push Button Return Spring
41	B-19.859-1F	Hinge Bracket for Push Buttons
42	57-3445-1	#8-32x 3/8 RHMS
43	B-19.870A	Locking Plate for Push Buttons
44	B-31.343A	Lock Plate Spring
45	73-2231-4	#6 Int. Lockwasher
46	57-3603-1	#6-32x 1/2 Phillips BHMS
47	57-3439-0	#6-32x 3/16 Bristol Head Set Screw
48	B-32.300D	Tape Guide Post (Left)
49		6-32 Hex Nut
50	B-32.260D	Tape Guide Post Spacer
51	B-35.794	Erase Head Plate Assembly
52	B-31.347B	Erase Head Tension Spring
53	B-31.334A	Pressure Pad (Felt) 2 used
54	57-428-1	#6-32x 3/8 RHMS
55	73-2233-1	Int. Lockwasher
56	48-2216-1	#2-56x 3/16 Hex. Nut
57	C-35.756A	Erase Head
58	B-35.766C	Record Actuating Lever Assy.
59	B-32.309	Tape Guide Post (Right)
60	C-36.156B	Tape Recording Head (Shure TR16H)
61	B-19.881C	Playback Actuating Lever
62	73-2241-148F	Flat Washer
63	B-31.336D	Pinch Roller Tension Spring
64	B-35.758	Playback Slide Plate Assembly
65	B-35.764D	Pressure Pad Spring Assembly
66	B-33.412	Push-On-Stud Nut, 3/16" Stud
67	B-19.868A	Record Slide Plate
68	B-33.409	Hairpin Clip
69	73-2340	Linen Washer
70	B-33.404E	Pinch Roller
71	B-19.858	Push Button Retainer Bracket
72	73-2340	Linen Washer
73	B-35.824A	Pinch Roller Plate Assy.
74	110-48-B	Switch Lever Assy.
75	B-31.338B	Brake Return Spring
76	C-35.835	Brake Slide Plate Assembly
77	B-33.412	Push-On-Stud Nut, 3/16 Stud
78	B-31.339	Idler Lever Tension Spring
79	B-35.759	Shift Plate Assembly
80	B-35.774	Record Interlock Assembly
81	B-31.333	Switch Arm Link
82	73-2241-118	Flat Washer
83	54-2030-35	Drilled Rivet 1/4x.122x7/32
84		(Bottom View of Item 38)
85	73-2231-5	#8 Int. Lockwasher
86	57-2102-3	#8-32x1/4 RHMS
87	B-19.863	Drive Mounting Plate Bracket
88	D-33.445	Gear Train for Tape Index
89	B-32.301	Brake Drum Shaft (Grooved)
90	B-28.163	Linen Washer
91	C-35.823	Brake Drum & Bushing Assy.
92	B-35.757D	Sub. Idler Plate Assy.
93	B-32.275-1E	#8-32 HH Shoulder Screw
94	B-35.405E	Sub. Idler Wheel
95	73-2254-6	Felt Washer
96	73-2241-150	Flat Washer
97	B-33.409	Hairpin Clip
98	B-33.118A	Spacer
99	73-2241-150	Flat Washer, Blued Steel
100	B-33.418	Truearc Retaining "E" ring
101	73-2254-6	Felt Washer
102	B-33.406C	Idler Drive Sheave
103	B-28.162	Idler Drive Belt
104	C-35.816	Speed Control Shaft Assy.
105	57-3589-1	8-32x1/4 Bristol Head Set Screw
106	57-2109-2	#6-32x3/16 Phillips BHMS
107	57-3679-1	#6-32x7/8 Phillips BHMS
108	57-3589-1	#8-32x1/4 Bristol Hd. Set Screw
109	B-35.755-6D	Push Button Assy., Blue (Model 4B10)
	B-35.755-5D	Push Button Assy., Gray (Model 4F10)
110	D-35.753-1	Drive Mounting Plate Assembly
111	73-2231-5	Internal Lockwasher
112	57-2102-3	#8-32x1/4 RHMS
113	B-28-159	Shock Mount
114	B-19-840E	Steady Bracket
115	B-23.163	Linen Washer
116	C-13.257-1C	Flywheel
117	B-28.163	Linen Washer
118	B-32.297B	Brake Drum Shaft
119		Erase Head Forward Adjustment Screw
120	73-2231-5	Internal Lockwasher
121	57-2102-3	#8-32x1/4 RHMS
122	B-19.862C	Angle Bracket for Mounting Drive Assy.
123	C-19.837F	Motor Adapter Plate
124	73-2231-5	#8 Int. Lockwasher
125	57-2102-3	#8-32x1/4 RHMS
126	B-33.411A	Flat Washer
127	73-2231-5	#8 Internal Lockwasher
128	48-409-1	8-32x5/16 Hex. Nut
129	D-36.153E	Motor, Round Type (Fasco)
	D-36.154G	Motor, Square Type (GI and Alliance)
130	B-33.418	Truearc Retaining "E" ring
131	73-2241-143	Flat Washer
132	73-2254-3	Felt Washer
133	C-19.887A	Fan Blade
134	73-2254-3	Felt Washer
135	73-2241-143	Flat Washer
136	33.415	Push-On Fastener
138	35.834	Idler Lever Assy.
139	97-3062	Brake Spring
140	B-31.335A	Brake Pad, Felt
141	57.3683-1	8-32x1/4 Undercut Flat Head
142	B-33.409	Hairpin Clip
143	B-28.163	Linen Washer
144	B-33.408C	Rubber Bonded Idler Wheel, 2 1/2" Dia.
145	B-28.163	Linen Washer
146	B-31.327D	Idler Lift Compression Spring
147	B-32.288D	Motor Pulley
148	57-2102-3	#8-32x1/4 RHMS
149	73-2231-5	#8 Internal Lockwasher
150	73-2241-143	Flat Washer
151	110-47	Idler Throw-Out Lever
152	B-32.291	Shoulder Washer
154	B-31.324A	Idler Spring(Tension)
155	57-2109-2	#6-32x3/16 Phillips BHMS
156	B-19.961	Speed Control Shaft Detent Spring
157	B-33.407-1	"C" Washer
158	51-3182	Shift Plate for High Speed
159	57-2109-2	#6-32x3/16 Phillips BHMS
160	B-31.324A	Idler Spring (Tension)
161	B-32.264F	Idler Slide Bushing
162	B-35.768A	Idler Slide Plate Assembly
163	57-3589-1	#8-32x1/4 Bristol Hd. Set Screw